THE

FOUNDRY TRADE JOURNAL

WITH WHICH IS INCORPORATED

THE IRON AND STEEL TRADES JOURNAL

VOL. 40. Thursday, June 6, 1929. No. 668.

PUBLISHED WEEKLY.

Subscription Terms: 15s. per annum.
Foreign and Colonial: 17s. 6d. per annum.
All Subscriptions are payable in advance.

All Communications to be addressed to the Editor, or to the Publisher, as the case may be, of
THE FOUNDRY TRADE JOURNAL,
49, WELLINGTON STREET, LONDON, W.C.2.

Telegraphic Address: "Zacatecas, Rand, London."
Telephone: Temple Bar 3951 (4 lines).

Contents.

	PAGE
Forthcoming Events	407
The Foundry Exhibition	407
The Iron and Steel Industrial Research Council	407
Foreign Delegation visits Research Association	408
The Institute of Metals	408
Contracts Open	408
Random Shots	408
International Foundry Trades Exhibition—Opening Ceremony and Inaugural Luncheon	409
How the Foundrymen of the World Co-operate	410
INTERNATIONAL FOUNDRY TRADES EXHIBITION—Representative Display at the Royal Agricultural Hall	411
Overseas Visitors on Tour	429
Trade Talk	432
Obituary	432
Reports and Dividends	432
New Companies	432
Iron and Steel Market	434
King's Birthday Honours	434

THE FOUNDRY TRADE JOURNAL IS THE OFFICIAL ORGAN OF THE INSTITUTE OF BRITISH FOUNDRYMEN; THE WELSH ENGINEERS' AND FOUNDERS' ASSOCIATION, AND THE FOUNDRY TRADES EQUIPMENT AND SUPPLIES ASSOCIATION.

Institute of British Foundrymen.

PRESIDENT: 1928-29:
S. H. Russell, Bath Lane, Leicester.

LIST OF SECRETARIES—

General Secretary: T. Makemson, Saint John Street Chambers, Deansgate, Manchester. London Office: 49, Wellington Street, London, W.C.2.

Birmingham: F. K. Neath, 24, St. Paul's Square, Birmingham.

Sheffield: T. R. Walker, 26, Castlewood Road, Fulwood, Sheffield.

Scottish: J. Bell, 60, St. Enoch Square, Glasgow.

Lancashire: H. Stead, 1st/36, Cheetham Hill Road, Stalybridge, Cheshire.

London: H. G. Sommerfield, Charterhouse Chambers, Charterhouse Square, London, E.C.1.

Newcastle-on-Tyne: F. Sanderson, 15, Handyside Arcade, Newcastle-on-Tyne.

East Midlands: H. Bunting, 82, Otter Street, Derby.

West Riding of Yorkshire Branch: S. W. Wise, 110, Pullan Avenue, Eccleshill, Bradford.

Wales and Monmouth Branch: J. J. McClelland, M.I.Mech.E., Druslyn, Bishops Road, Whitechurch, Glam.

Middlesbrough: N. D. Ridsdale, 3, Wilson Street, Middlesbrough.

Foundry Trades Equipment and Supplies Association.

President: H. Winterton, Kelvinvale Mills, Maryhill, Glasgow.

Secretary: K. W. Bridges, Avenue Chambers, Southampton Row, London, W.C.1.

Welsh Engineers' and Founders' Association.

Secretary: E. J. Griffiths, 20, Fisher Street, Swansea.

BRITISH CAST IRON RESEARCH ASSOCIATION.

The Registered Office and Laboratories of the B.C.I.R.A. are at:—
24, ST. PAUL'S SQUARE, BIRMINGHAM.
Telephone: Central 1895. Telegrams: CIRA.
The B.C.I.R.A. Scottish Laboratories are:—
Foundry Technical Institute, Meek's Road, Falkirk *(Telephone 332)*

Forthcoming Events.

JUNE 4-7.
Institution of Gas Engineers:—Annual general meeting in London.

JUNE 5-15.
International Foundry Trades Exhibition, Royal Agricultural Hall, London, N.

JUNE 10-14.
International Foundry Congress:—26th Annual Convention of the Institute of British Foundrymen.

The Foundry Exhibition.

British, American, French, German and Belgian enterprise has co-operated to make this show, which opened at the Royal Agricultural Hall, yesterday, the most comprehensive foundry equipment and supply exhibition ever organised. It may not be as large as those which have been held in other countries, but we assert that for completeness and variety and true internationality it stands unique.

For the benefit of overseas visitors it should be explained that the foundry equipment industry decides when and where the exhibitions are to take place through its representative organisation—the Foundry Trades Equipment and Supplies Association, Limited. They commissioned Messrs. F. W. Bridges, Limited, to stage the Exhibition, as they had had previous experience of their excellent organising ability. Because of their close association with the Institute of British Foundrymen, the "Equipment" association was well placed to form a strong technical advisory committee. This has been presided over for the second time by Mr. Wesley Lambert, the President-elect of the Institute. If work is to be done, it is a British precept that those responsible for it must be of a minimum number. Therefore, for the staging of a technical exhibit, a sub-committee, presided over by Dr. W. Rosenhain, F.R.S., Director of the Metallurgical Department of the National Physical Laboratory, and in addition Dr. Hutton, Mr. J. G. Pearce and Mr. F. K. Neath, was formed, the last named acting as honorary secretary. The thanks of the foundry industry are due to these gentlemen for the enormous amount of work and energy they have displayed in giving a wonderful approximation of the research work being carried out in Great Britain to help along its key industry.

In the Gilbey Hall there is an exceptionally fine display of machine tools. The *raison d'être* for this exhibit is a realisation of the close co-operation which must necessarily exist between engineering and foundry practice. Certain foreign makes of machine tools have been excluded in recent years from British exhibitions, and it was deemed desirable that industry should be rendered cognisant of every type of machine which would help them to produce their goods at the lowest possible cost. Expert opinion assures us that many of the machines shown in the Gilbey Hall are of the latest design, and as many foundry owners and managers are also trained as machine-shop men, this will be an exceedingly useful complementary show.

Naturally, THE FOUNDRY TRADE JOURNAL is represented, and we extend our invitation to both advertisers and readers to use the Stand as an information bureau and rest-room.

The exhibition has been well timed, and we are convinced that it will be to the ultimate benefit of international relationship, to British industry in general and to the foundry trade in particular.

The Iron and Steel Industrial Research Council.

At the recent dinner of the Iron and Steel Institute Sir William Larke referred to the creation of the new Iron and Steel Industrial Research Council, and this event marks a very important step forward so far as the technical problems of the heavy industries are concerned. There has been a good deal of comment of recent years on the fact that there was no steel research association in existence, and to some extent the new body is likely to repair the omission. It is, of course, well known that the National Federation of Iron and Steel Manufacturers has done a considerable amount of technical work. This has been effected in the first place through its Fuel Department, which has access to statistics relating to fuel consumption in blast and other furnaces, and in the second place by assistance in the promotion of the district Coke Research Committees which have been set up in Sheffield, in Newcastle, and in Scotland.

An important feature of the new body is the care that is being taken to avoid any sort of duplication of the work of existing organisations, and to ensure the fullest possible co-operation with all such organisations, wherever they are functioning on work of a cognate character. In particular we understand that the Cast Iron Research Association will be represented on the council of the new body, and that there will be active co-operation between the two. The new Council will, moreover, confine its attention mainly to process work in the steel trade, and will not undertake anything in the nature of fundamental research. This suggests that if the problems of the ferrous industries are to be completely covered, the Cast Iron Research Association might well be left to cultivate the whole of what might be termed the foundry side of the ferrous trades—*i.e.*, foundry pig-iron, chilled castings, malleable iron, grey iron, and steel castings. In favour of such an arrangement it may be said that the work now being carried out by the Association has an essential unity of interest in the foundry trade itself—metal, its composition and treatment, the related problems of refractories, moulding sands, metal melting, and after-annealing. That the new organisation is far-sighted enough to lay down co-operation of this sort as one of its fundamental conditions is no small recommendation, were any likely to be needed, and its advent will be warmly welcomed.

XUM

Foreign Delegation visits Research Association.

In response to the interest displayed by a number of members of the group visiting Birmingham, a party was arranged to see the headquarters of the British Cast Iron Research Association. In the unavoidable absence of the Director, they were met by Mr. F. J. Cook, Vice-Chairman of Council and Past-President of the Institute of British Foundrymen, and members of the staff.

It was explained that the Cast Iron Research Association is a voluntary association of manufacturers of foundry pig-iron, grey-iron, chilled-iron and malleable-iron castings, and that it is a national and State-aided body, membership of which is open to all British firms in the industry. The various services rendered by the Association were indicated, these consisting firstly of the provision of any published information relating to the industry supplied on demand from the well-equipped library and information bureau. The Association publishes each quarter a non-confidential quarterly "Bulletin," in which technical matters relating to the foundry published all over the world are abstracted, the originals being available on loan in the library in nearly every case. In addition, translations of important foreign papers are carried out. Constant contact is maintained with foreign organisations and developments, and the Association is able to report to its members quite impartially on foundry developments from other countries.

Secondly, the Association carries out investigations in connection with the improvement of foundry products and cheapening of costs. These investigations are carried out not only at headquarters, but at various university and other laboratories throughout the country, and in the works of members. Only a comparatively small proportion of the work done by the Association is carried out in Birmingham, the work on moulding sands, in particular, being located at the University of Sheffield, and light castings at the Association's Scottish laboratory, the Foundry Technical Institute, Falkirk. The Association also co-operates in work being carried out at the University of Birmingham and the University College, Nottingham, and many members' foundries. Reports of these investigations are issued at intervals, and are confidential to members, although the Council frequently approves of the publication to scientific and metallurgical institutions of certain reports of general scientific interest.

Thirdly, the Association provides a service of advice to members in connection with new foundry developments and foundry difficulties. This also is a confidential service to individual members, and is greatly appreciated.

Many other services are rendered through the Association's connections with other technical, scientific and commercial bodies in the industry and with Government Departments. In particular, the Association has co-operated with the Institute of British Foundrymen in the standardisation of tests for grey and malleable iron, now embodied in B.E.S.A. Specification 321—1928, and white-heart and black-heart malleable, embodied in B.E.S.A. Specifications 309—1927 and 310—1927. The visitors were shown the library and information bureau, the offices and the research laboratory, together with the laboratories for chemical analysis, mechanical testing and photomicrography.

As indicated above, full membership is confined to British producers—that is, producers whose capital and directorate is mainly British, but the Government has permitted works established in Britain to become members if they employ British labour, even though this condition is not strictly fulfilled. There are members in India, Canada, Australia, etc. Provision is made for users of cast iron and makers of foundry supplies and equipment to become members for a nominal annual subscription, and individual persons in the industry may become members of the Association by payment of 30s. per annum for the use of the library and information service and the "Bulletin." The "Bulletin" will also be sent to non-British nationals for the same annual subscription, and members of the Institute of British Foundrymen are able to obtain this for the reduced figure of 20s. per annum. The Director will gladly supply further information to those interested.

The Institute of Metals.

Autumn Meeting at Düsseldorf

The annual autumn meeting of the Institute of Metals will take place in Düsseldorf from September 9 to 12. An influential local reception committee has been constituted under the direction of Herr Dr. Heckmann, the honorary local secretaries being Herr Dipl.-Ing. Patzak and Herr. Dr.-Ing. Max Haas. It is hoped that the meeting, which is the first held by the Institute in Germany, will be well attended, and that members will be able to accept the hospitality to be offered.

Members will assemble in Düsseldorf on September 9, when the office of the honorary local secretary will be open for the distribution of tickets and badges. This office will be situated at the Breidenbacher Hof Hotel, which will be the official headquarters of the Institute in Düsseldorf. In the afternoon the eighth annual autumn lecture will be delivered by Dr. A. G. C. Gwyer, B.Sc., on "Aluminium and Its Alloys." Members will be free to make their own arrangements for the evening.

On September 10 the morning will be occupied by the reading and discussion of Papers, the afternoon being devoted to visits to works. In the evening the City of Düsseldorf will entertain members and their ladies to dinner. In the morning of September 11 further Papers will be presented for discussion and the business meetings will be brought to a conclusion. The afternoon will be devoted to visits to works, and in the evening there will be a cabaret and dance in the Rheingoldsaal.

On September 12 an all-day trip will be arranged to Essen to visit the works of Messrs. Friedrich Krupp, Essen, and the party will return to Düsseldorf in time to allow members returning at once to England to travel by the night boat train. For other members extensions are being arranged, one including a trip through Holland and another a visit to Berlin.

Members are invited to attend meetings of the Deutsche Gesellschaft für Metallkunde and other German metallurgical societies which are being held in Düsseldorf prior to the Institute of Metals meeting on September 7 and 8.

Members wishing to partake in this meeting should address their inquiries to Mr. G. Shaw Scott, Secretary, Institute of Metals, 36, Victoria Street, Westminster, London, S.W.1.

Contracts Open.

Angora, June 8.—Cast-iron pipes, specials, valves, etc., for the Administration Générale des Chemins de fer et Ports d Etat. The Department of Overseas Trade. (Reference A.X. 7984.)

Barwick-in-Elmet, June 8. — Cast-iron water mains, with valves, hydrants, etc., for the Tadcaster Rural District Council. Mr. E. Thackray, water inspector, Station Road, Kippax, near Leeds.

Beyrout.—6,100 metres of water piping, for a local firm. The Department of Overseas Trade. (Reference A.X. 7,988.)

Cardiff, June 10.—100 ordinary lamp pillars, for the Corporation. Mr. G. H. Whitaker, city engineer, City Hall, Cardiff.

Chichester, June 25.—Pumping plant, for the Town Council. Mr. F. J. Lobley, "Greyfriars," 61, North Street, Chichester. (Fee £2, returnable.)

Random Shots.

I have always thought that there must be a snag somewhere about the old theory of the swings and the roundabouts, and I think I have discovered just what it is. I read the other day a journalistic lament to the effect that it was retrograde, behind the times, etc., etc., etc., that our national water supply, including the water supply of London, should still in large measure be allowed, nay, encouraged, to flow through cast-iron pipes, to the end that a severe frost caused bursts, cracks and other inconveniences. The article in question further suggested the universal substitution of steel for iron pipes, and the comment was made that such a policy would mean "much more work for British steel industries." But what about British iron industries?

* * *

In other words, a loss on the swings is all very well if you happen to own roundabouts as well. But if it is the other fellow who owns the roundabouts, then your equanimity is inclined to be upset by any marked shift in popularity. It reminds me of the old troubles that followed upon the introduction of the first mechanical devices into British industry. Rather more than a century ago there were riots all over the country on the introduction of power looms and the consequent loss of employment to large numbers of the old hand-loom weavers. It was pointed out by the experts—did they call them economists in those days, I wonder?—that the new inventions would, over a period of years, result in increased activity in the industry concerned because of the cheapening of the goods and the consequent increase of demand, and that employment would likewise increase far beyond the old level. That was all very well, the displaced workers said, but how long a period of years would be required? Ten years, perhaps, said the experts; twenty, thirty—who knows? And they could not understand why the unfortunate hand-loom weavers continued to riot, unmollified by the promise of plenteous employment for their grandchildren and their great-grandchildren.

* * *

The recent election may not have produced much fresh humour of its own, but it was at least responsible for the resuscitation of the best of the old election yarns, many of which, I have heard it said, "are so good that they deserve to be true." There was the rather delightful one of the persistent interrupter at a meeting in the old Tariff Reform days, who repeated over and over again, "I won't have my food taxed." At last the speaker turned to him and said, "Let me reassure the gentleman who is so concerned about his food. It is not Mr. Chamberlain's intention to tax thistles."

* * *

Then there is the one usually credited to Mr. Tim Healey during an Irish election. "What, vote for you?" said a man who was being canvassed. "I'd sooner vote for the devil!" "But, in the event of your friend not being nominated," was the reply, "may I ask for your vote?"

* * *

Which is reminiscent of the young Lloyd George advocating Home Rule with some vehemence, and the interrupter who remarked, "Home Rule for hell!" "Quite right, my friend," Mr. Lloyd George told him, "I like every man to speak up for his own country!"

MARKSMAN.

International Foundry Trades Exhibition.

OPENING CEREMONY AND INAUGURAL LUNCHEON.

Yesterday, at the opening ceremony of the 5th International Foundry Trades Exhibition, over which Mr. Harry Winterton presided, Sir T. FORTESCUE FLANNERY, BT., who has many connections with the foundry industry, said that three thoughts occurred to him on that occasion. His first thought was that the interests of the working man and those of the inventors of labour-saving machinery were the same thing. There was a time when operatives struck work against machinery, crying out that the bread was being taken out of their mouths. To-day the reverse is obtained. The more one could produce for a given amount of human labour, by labour-saving machinery, the more one would cheapen the product, encourage its consumption and the trade, and the more employment one can give the workers.

His second thought was on the marriage and inter-marriage between theory and practice. This was an Exhibition of practical working machines and of instruments used by professors in the course of their research work. Never before in the history of this country has there been so much intense development as there has been in the last twenty years or so in scientific researches as applied to engineering.

Finally, he expressed a thought on the inter-communication of nations in regard to commercial enterprise. There was a time when men kept to themselves the secret of a particular process. To-day it was different. Let each man join with all the others, and each give of his best in the way of information, and receive information in exchange. This Exhibition was an illustration of the wonderful improvement in that international understanding.

He was accorded a hearty vote of thanks, on the motion of MR. A. S. BEECH, seconded by MR. D. H. WOOD, both of whom are vice-presidents of the "Equipment Association."

Inaugural Luncheon.

At the luncheon which followed the opening ceremony, SIR FORTESCUE FLANNERY, replying to the toast "Our Principal Guest," proposed by MR. H. G. SOMMERFIELD, said that one great advantage of an exhibition like this is that it tends to cultivate salesmanship. Members of the International Congress of Foundrymen were to visit the various works throughout the country. At the Soho Foundry, Birmingham, they were showed many things of historic interest, such as the workshop of James Watt and the first gasholder. They were also shown the latest developments in weighing machinery, testing machinery and automatic machinery. They were undoubtedly convinced that Britain still leads the way in perfection of manufacture.

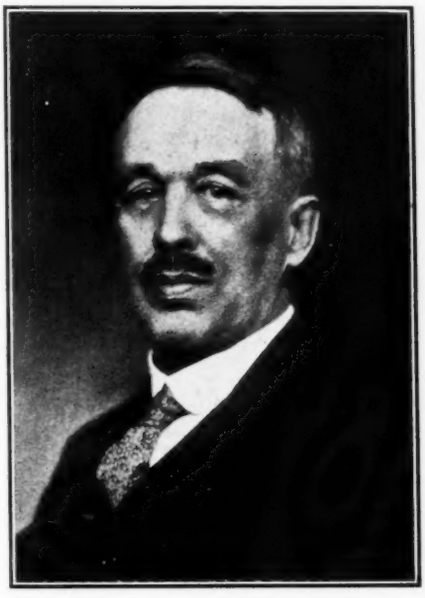
SIR ROBERT A. HADFIELD, BT., proposing the toast of "The Exhibition," said he was honoured by being asked to propose a very important toast, in fact with regard to the object for which we are all gathered together to-day—the toast of the day, "Success to the International Foundry Trades Exhibition."

He had pleasure in coupling with it the name of Mr. Winterton, the President of the Foundry Trades' Equipment and Supplies Association, Limited, and Mr. E. H. Jones, Chairman of the Machinery (Machine Tools and Woodworking) Importers' Association. At the same time he offered hearty congratulations to the President of the Institute of British Foundrymen, Mr. S. H. Russell, on the successful work he is carrying on, also to its able and hard-working Secretary, Mr. T. Makemson.

He had had the pleasure of opening what was the first serious Foundry Exhibition in 1926, which this year Sir John Fortescue Flannery has to-day so ably done. Every foundryman in the country would wish a great success to this important Exhibition, which had been got together with such care, thought, labour and expense. It will be seen how much this present 1929 Exhibition has grown in size and importance compared with those of previous years, showing the advancing influence of this branch of industry.

All know the importance of the foundryman, whether employer or employed, in his relation to the engineering and metallurgical industries of our country, and whether relative to cast steel, cast iron, or non-ferrous products.

Most of us present to-day will remember that Black Year 1919, when the moulders' long-drawn-



MR. H. WINTERTON
(Chairman of the Foundry Trades' Equipment and Supplies Association).

out strike occurred, and the general public discovered from the various stoppages of supplies how important foundry products were for their convenience—in fact, existence.

Many millions of tons of such products are now required annually throughout the world, and it is no exaggeration to claim 10 to 12 million tons per annum for the world's output of castings of all kinds. All this vast quantity of work has to pass through the moulder's hands.

He had always respected the work of the foundryman, additional reason being because when first commencing his life's work he well remembered in his amateur attempt to produce small castings in the little experimental workshop his father allowed him to have at home, how many were the wasters he turned out for one good casting! In after life, this made him more sympathetic with the moulder, whose weekly account has sometimes to be docked because of his high percentage of wasters.

There was present the new President of the Iron and Steel Institute, Professor Henry Louis, to whom everybody would offer a most hearty welcome. He has himself greatly helped on the cause of Metallurgy. Those who heard his most interesting and thoughtful Presidential address were much impressed by it, and in him we have one who would always help on progressive movement for increasing knowledge in that branch of science known as metallurgy.

He wished to take advantage of the function to congratulate Sir Harold Carpenter on his recent Knighthood. Sir Harold had carried out sterling work for the foundry industry through his researches into the growth of cast iron.

Value of Exhibitions.

Speaking of exhibitions generally, without doubt these serve a most useful purpose in showing the state of the art which they represent, stirring up men's minds to do better and still better things.

He had always considered that some of his early inventions, which have proved so useful and valuable to the world, including manganese steel, silicon steel, and other metallurgical advances, developed from ideas arising in his mind as the result of visits to exhibitions. He specially remembered the Paris Universal Exhibition of 1878, to which his father took him when he was 19 years old, and where he saw a magnificent collection of steel castings and other metallurgical products by the famous Terre Noire, La Voulte and Bességes Foundry, Iron Works and Steel Company. Their exhibits were organised by three eminent French metallurgists of that day, Euverte, Pourcel and Gautier. He was glad to say that M. Pourcel is alive to-day, and has received the Bessemer Gold Medal of the Iron and Steel Institute.

MR. S. H. RUSSELL (President of the Institute of British Foundrymen), supporting Sir Robert, said that the provinces were sending a record number of delegates to the London conference, to be held next week.

MR. H. WINTERTON (President of the Foundry Trades' Equipment and Supplies Association, Limited) responded, and Mr. E. H. Jones (Chairman of the Machinery Importers' Association of Great Britain), supporting Mr. Winterton, emphasised the necessity of British workmen having only the best tools and equipment.

MR. V. C. FAULKNER, proposing the toast, "Science and the Industry," said industry had recently been defined as the co-operation of brain, labour and capital for the conversion of raw materials into articles of commerce. Science had been defined as an exact knowledge. If you will just combine these two definitions one has an excellent conception of what is known as rationalisation.

Scientists have always been telling industrialists to rationalise. He thought it was time the industrialists turned round and told the scientists to rationalise. He was perfectly certain that there were too many metallurgical departments attached to British Universities, and consequently they were financially "on the dole."

He suggested for five years there should be no more research, but rather should there be a stocktaking and an ascertainment of the gaps necessary to be filled.

DR. WALTER ROSENHAIN, F.R.S., replying to Mr. Faulkner's provoking statements, said that what was wanted was not a five years' holiday from research, but five times as much research per year.

"The abstruse physics of to-day," he reminded his audience, "are the engineering practice of to-morrow. Practical men must be led by easy stages to realise the importance of the most advanced scientific work." He appreciated sincerely the laudatory remarks that had been made in connection with the Technical Exhibit, and his responsibility for its success. He regretted that the time had been so short, as he believed it to be possible to stage an exhibition which would take the foundry operative in easy stages from the elementary underlying principles to the most recent academic discoveries. He wished to acknowledge the help he had received from the Secretary of the sub-committee responsible, Mr. F. K. Neath.

DR. R. S. HUTTON wound up the luncheon by proposing the toast of "The Chairman," to which MR. H. WINTERTON suitably replied.

How the Foundrymen of the World Co-operate.

By H. Cole-Estep,

Chairman, American Foundrymen's Association Committee on International Relations.

Throughout the world to-day foundrymen are enjoying the benefits of intimate contacts and co-operation. No other group is as well organised for international relations. This is clearly demonstrated by the great congress of foundrymen and international exhibition being held this year in London. From all over the world foundrymen are being drawn together to discuss the common problems of their industry, for the purpose of developing better foundry practice throughout the world.

Besides promoting the progress of their own industry, the foundrymen of the various nations, through their close international associations, are making definite and valuable contributions to the maintenance of world peace. Surely there could be no more worthy object for which a group of business men, engineers, and scientists could band together. What foundrymen are trying to do through their international activities is to make a real contribution to human progress.

This great world-wide co-operative movement among the producers of castings is the result largely of the initiative of a small group of leaders in the Institute of British Foundrymen and the American Foundrymen's Association, together with certain individuals representing the leading foundry organisations on the Continent.

Largely as the result of their courage and vision the Foundrymen's International committee has been created and definite arrangements perfected to carry on the International Foundrymen's congresses at regular intervals of three years. Among those who have been prominent in the development of the enjoyable and educational contacts in which the foundrymen of the world now participate are Oliver Stubbs, F. J. Cook, Vincent C. Faulkner, Wesley Lambert, R. O. Patterson, S. H. Russell, John Cameron, Frank Russell, John Shaw, the late Thomas Firth, and others representing the Institute of British Foundrymen.

Among those co-operating with this group on behalf of the American Foundrymen's Association have been S. W. Utley, A. B. Root, Jr., C. E. Hoyt, S. T. Johnston, L. L. Anthes, G. H. Clamer, Stanley G. Flagg, Jr., Verne E. Minich, Enrique Touceda, Dr. Richard Moldenke, L. W. Olson, W. R. Bean, the late A. O. Backert, John A. Penton, and many others.

Among the Continental foundrymen who have been especially interested in the development of closer international relations are E. V. Ronceray, Emile Ramas, Leon Thomas, Paul Ropsy, Joseph Leonard, J. M. Espana, Carlo Vanzetti, Prof. Pisek, Dr. ing. Werner, Dr. ing. Geilenkirchen, and others.

Before the war various European foundrymen visited the United States and American casting manufacturers went abroad, being drawn into contact by the common problems of the business in which they were engaged. Thus international relations were established on an informal basis.

The first formal step toward bringing the foundrymen of the world together was taken by the late Mr. A. O. Backert, who visited England, France and Belgium in 1919 in his official capacity as president of the American Foundrymen's Association. Through the force of his great and charming personality, Mr. Backert gave real impetus to the idea of setting up some kind of machinery for bringing the foundrymen of America and Europe into contact at regular intervals. This visit was returned by Mr. Oliver Stubbs during one of his terms as president of the Institute of British Foundrymen in 1922, Mr. Stubbs being accompanied at that time by the late Mr. T. H. Firth, past president of the Institute of British Foundrymen.

Exchange of Papers Suggested.

Meanwhile the writer, then resident in England in 1920, suggested to the Institute of British Foundrymen a plan for a formal exchange of papers with the American Foundrymen's Association. The proposal was promptly accepted by his British friends. Thus was set up an arrangement which has resulted in the exchange of around 20 papers in the past nine years between the American Foundrymen's Association and its European confrères.

The annual exchange of papers is now a part of the regular routine of both the British and American Associations. Each year the Institute appoints one of its members to contribute a paper to the American Foundrymen's Association on some subject of major importance to the British foundry world. In turn the American Association appoints one of its members to present a paper before the Institute of British Foundrymen. In a number of cases the authors have journeyed across the Atlantic to read their papers in person.

MR. H. COLE-ESTEP

(Chairman of International Relations Committee of the American Foundrymen's Association).

These arrangements between the American and British Associations have proved so successful that similar exchanges are now taking place between the American and the French and Belgian Foundrymen's Associations, and between the French and Belgian organisations and the British; and others. Thus has been set up a great ebb and flow of practical, useful information between the foundrymen of the world, which has had the effect of quickening technical and business progress everywhere.

The international exchange of papers on foundry practice led naturally to the organisation of the International Foundrymen's congresses. The first of these great world gatherings of castings manufacturers was held in Paris in 1923. Its definite organisation sprang from a luncheon in Birmingham, England, at the time of the first British foundry equipment exhibition in 1922, which was attended by Oliver Stubbs, Col. Cheesewright, Vincent C. Faulkner, F. J. Cook, E. V. Ronceray, H. L. Reason, Emile Ramas, Stanley G. Flagg, Jr., J. Leonard, J. Varlet, Enrique Touceda, the late Mr. T. H. Firth, and the writer.

The International Congresses.

A delegation of about sixty British and fifty American foundrymen attended the initial International Congress in Paris in 1923. In 1926 the second congress was held in Detroit under the auspices of the Americain Foundrymen's Association. A delegation of over a hundred European visitors was entertained, many of whom were British. It was preceded and followed by tours, in the course of which the European guests were greeted and entertained by the foundrymen of New York, Philadelphia, Buffalo, Chicago, Cleveland, and Pittsburgh.

From the second International Foundrymen's congress in Detroit sprang the organisation of the Foundrymen's International Committee, previously mentioned, of which S. T. Johnston, president of the A.F.A., will be chairman this year. This committee consists of delegates appointed by British, French, Belgian, German, Czechoslovak, Dutch, Italian, Luxembourg, Spanish, and American foundrymen's organisations.

The American Foundrymen's Association believes firmly in international co-operation, and for the purpose of promoting this branch of its activities it has a standing committee, known as the Committee on International Relations, the membership of which now includes L. L. Anthes, G. H. Clamer, Stanley G. Flagg, Jr., S. W. Utley, Vincent Delport, Verne E. Minich, S. T. Johnston, Fred Erb, C. E. Hoyt, and H. Cole-Estep, chairman.

All foundrymen throughout the world are confronted with a common problem—how to make better castings more economically. The individual foundryman has the additional responsibility of developing his capacity to the highest possible level in order that his personal rewards may be correspondingly increased and his contributions to his chosen profession increasingly important.

Participation in a great congress of foundrymen such as that scheduled next week in London is of direct assistance in meeting the responsibilities and problems with which the modern foundryman is confronted. And as the individual foundryman is successful, so is the prestige and usefulness of the foundry industry in general advanced.

Patent Specifications Accepted.

The following list of Patent Specifications accepted has been taken from the "Illustrated Official Journal (Patents)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The last numbers given are those under which the Specifications will be printed and abridged, and all subsequent proceedings will be taken.

31,898. ROYEN, DR. H. J. VAN. Processes for the production of pure iron. 282,365.

31,899. ROYEN, DR. H. J. VAN. Manufacture of steel. 282,366.

14,978. AXMANN, F. K. Sand-throwing apparatus for making moulds. 308,921.

32,564. TALBOT, B. Metallurgical furnaces. 293,010.

339. ACKERMANN, H., and SCHEIDHAUER & GIESSING AKT.-GES. Moulding boxes. 283,852.

35,102. LOKE, W. A. Reduction of metallic ores and the manufacture of metals and metallic alloys. 309,458.

905. SOC. ANON. FONDERIA MILANESE DI ACCIAIO. Manufacture of steel in electric furnaces. 283,489.

19,277. VEREINIGTE STAHLWERKE AKT.-GES. Wire-winding machines. 294,205.

34,001. STAHLWERK BECKER AKT.-GES. Manufacture of steel. 282,744.

International Foundry Trades Exhibition.

REPRESENTATIVE DISPLAY AT THE ROYAL AGRICULTURAL HALL.

This manifestation of recent developments for the conduct of the world's key of key industries was opened yesterday by Sir Fortescue Flannery. It should be made perfectly clear at the outset that it is not a "foundry" exhibition—the nearest approach to such an enterprise would be approximated by Wembley, if one only had "eyes to see." There, the product of the foundry was shown built into every kind of machinery and engineering construction. But such an interest is limited and academic. Now at the Agricultural Hall the exhibition is devoted to placing before the foundry world a comprehensive collection of the machinery available for economic production; the raw materials and their potentialities; machine tools for handling its products, and a technical exhibit which illustrates the extent to which research work has helped the industry. The last section is devoted to illustrating the educational facilities available for the training of the future personnel, both executive and operative, for the industry.

MR. K. S. BRIDGES
(*Organiser of the Exhibition*).

Since the last exhibition in June, 1926, the most striking development in the industry has been the co-ordination of machinery. No longer will the foundry manager be content to buy a moulding machine as a unit. He insists on learning how the supplier proposes to bring the sand to the machine and how the product is to be taken away, and how much extra work is to be thrown on the core shop. This has resulted in such developments as, in one case, a co-ordinated exhibit of moulding machines and continuous casting, whilst in another one of the makes of riddle—sand-throwers has been oriented so as to fill bunkers located above the machines. These "throwers," by the way, have been subjected to much development during the past three years, and now there are four or five designs to choose from. Cupolas are only being shown by one firm, and even that partially incorporates a specialised system. This is apparently indicative of a trend of thought that, providing the foundryman is given a plain, well-constructed yet normal cupola, he can, by internal control, obtain results of a meritorious character.

Undoubtedly, the range of sand-blast machines on exhibit is the most comprehensive ever placed before the public. When intelligently installed, having transport costs well in hand, this plant need not seriously enhance cleaning costs. The attention which has been bestowed on the sanitary aspect is commendable.

Both the technical exhibit and some commercial stands illustrate the developments which have been taking place for the improvement of the physical properties of cast iron. When we were a student we were taught that poor cast iron gave 8, normal 10, and good cast iron 12 tons per square inch. A country jobbing foundry ought to be ashamed if this represented its best practice to-day.

It is probable that a moulding machine, which fills boxes by the high-speed projection of sand utilising compressed air, will create a great deal of interest.

The organisers, Messrs. F. W. Bridges & Sons, Limited, are to be congratulated on the manner in which they serve the foundry industry. They were the first to realise that industry would be interested in seeing a collection of the machines and supplies used by the foundry trades. This is the fifth foundry equipment exhibition held in Great Britain, and three of them have been the product of the "Bridges" organisation. Mr. Kenneth Bridges, who acts as honorary secretary to the Foundry Trades Equipment and Supplies Association, has done sterling work in creating a co-operative spirit amongst the firms engaged in the industry. In this work he is ably seconded by Mr. Perrin, his principal assistant. Most of the exhibits are covered by the detailed description which follows, but it is realised that it can in no way replace a personal inspection, and it is the duty of every foundry-owner in Great Britain not only personally to visit the exhibition, but also to afford facilities for his managers, foremen and staff to this end.

The Fordath Engineering Company, Limited.—This progressive firm have helped in no small measure to modernise core-shop practice in British foundries. They have recently established a laboratory in order that the research work they carry out should be more under their direct control. Naturally enough, the principal exhibits should relate to Glyso, and its potentialities are demonstrated by the exhibition of a large number of cores made from it. Since the last Exhibition the firm have placed on the market the Rotoil mixer, and it is being demonstrated in operation in association with a sand-sieving and feeding plant. As this machine is being shown for the first time, it warrants the close attention of every visitor. A new type of rotary core-making machine is also being demonstrated.

The head office is located at Hamblet Works, West Bromwich; whilst agencies and depôts have been established in India (The Thermic Steel Company), in Holland (The Foundry Specialities Company, Rotterdam) and in Australia (Mr. W. L. Allen, Manufacturer's Buildings, Melbourne). The personnel attached to the Stand is composed of Major J. W. Athey, Mr. T. C. Carlin, Mr. A. H. Newsum, Mr. W. M. Wilson, Mr. J. Masters and Mr. H. Roberts.

T. H. Gray & Company, Limited.—Naturally "Silacene," the well-known refractory, is chief exhibit. Practical demonstrations are being given of the most up-to-date method of installing a monolithic lining in a cupola. Other products of this firm on view are iron ore, iron cement, parting powder, non-ferrous fluxes and a desulphurising compound.

The personnel attached to the Stand will consist of Mr. T. H. Gray (managing director), Herr Dr. Brükl (Central European representative), Mr. G. Duguid (Midlands), Mr. F. C. Ralph (North-East Coast), Mr. W. Holland (Lancashire and Yorkshire), Mr. A. S. Wall (South Wales), Mr. M. Grindal (Scandinavia), Mr. A. Campion (Scotland) and Mr. D. Allen (Sheffield).

The head office is situated at 119, High Holborn, London, W.C.2. A branch office is maintained at Midland Road, Thrapston, near the works and quarries—Isebrook Mills and Midland Works. Stocks are maintained at the agencies established in Berlin, Vienna, Motala, Bilbao, Vancouver, Auckland, Sydney, Melbourne and Toronto.

William Cumming & Company, Limited.—This Stand is devoted to blackings, plumbagoes, graphites and that well-known core-compound "Cummingum." As it is virtually impossible to describe these essential yet varied commodities for the foundry industry in detail, it has been deemed desirable to indicate the service which is at their back. Primarily, in order that the foundries may receive the benefit of low railway charges from the factories to their works, mills have been established at the head office, Kelvindale Mills, Maryhill, Glasgow; Sunnyside Mills, Falkirk; Whittington Mills, Chesterfield, and Deepfields Mills, Bilston. These are equipped with the most modern machinery and are controlled from three laboratories. In addition, frequent recourse is made to leading consulting engineers and metallurgists in order that no internal mental ruts may be formed.

MR. E. PERRIN
(*Principal Assistant*).

The member of the staff in charge of the Stand is Mr. C. H. V. Wilson, London and home counties' representative, and there are also in attendance, Mr. R. C. Waddell, director and Scottish representative; Mr. Bert Winterton, manager, Chesterfield Works; Mr. James Ellis, practical demonstrator and expert; Mr. H. Phillips, Midlands representative; Mr. A. Hares, South Wales and West of England representative; Mr. E. A. Carlisle, Lancashire and North Midlands representative; and Mr. F. A. Harper, North-east representative.

Pneumatic Engineering Appliances Company, Limited.—The first exhibit to be noticed on this Stand is the No. 2 "Peacolt" turnover moulding machine, which has been adopted by most of the railway groups as well as a large number of carriage and wagon builders for

manufacturing the new Railway Clearing House axlebox—acknowledged to be a very intricate casting to make. The moulds for this are demonstrated to be quite easy on this machine, without any touching up by hand after the pattern is withdrawn.

The No. 45 machine is a direct-draw machine of recent design, and is quite satisfactory in operation.

The drills and hammers being exhibited are the well-known "Key" type, which is an improved "Thor." They are largely used at the British Admiralty Yards and numerous industrial concerns.

The head office is at Oswaldestre House, Norfolk Street, London, W.C.2, and the works address is Imperial Works, Derby Street, Cheetham, Manchester. Agencies have been established at Buenos Aires, Copenhagen, Johannesburg and Melbourne.

The directors have thrown open their Manchester works for inspection during the run of the Exhibition.

Atlas Preservative Company, Limited.—This firm's exhibit should be one of particular interest to those concerned with the economic upkeep of foundry plant, buildings and equipment. Their Stand is given over largely to a display of models and photographs of typical structures treated with "Atlas Ruskilla" iron and steel preservative paint.

It is claimed for this material that, by reason of the special medium employed in it, it will stand up to conditions which would render ordinary paints too short lived to prove profitable. It grips the metal tenaciously, forming a tough covering which all through its long life stubbornly resists the attacks of acid and alkali fumes, steam, moisture and exposure to the weather. This would seem to be borne out by the fact that it is extensively employed in the foundry trade and in chemical works, mines, tanneries and other spheres where adequate protection from rust is essential but difficult to obtain.

"Atlas Ruskilla" is elastic, and consequently does not chip or crack, but expands and contracts with the metal. It is made in black, white, aluminium and a range of attractive colours, all of which have good covering power and superior finish. This Company has been engaged for nearly 30 years in making paints designed specifically for protection of ferrous surfaces, and the benefit of their experience is available to all who consider they have exceptional circumstances to contend with.

The head office and works are located at Deptford, London, S.E.8, and branch offices have been established at Glasgow (15, York Street), Liverpool (31, Dublin Street, Regent Road) and Cardiff (112, Merchants' Exchange, Docks). The sales organisation is world-wide. The personnel in attendance at the Stand consists of Mr. E. J. Penston, Mr. B. K. Brown and Mr. A. P. Muncey.

The Midland Sand Blast and Foundry Supplies Company, Limited.—The exhibits shown on this Stand consist of a *Tumbling Barrel Sand-blast Machine*, which has a slowly-rotating barrel carried on roller pulleys and driven by chain and chain wheel. A rocking nozzle blows from the side and sprays the sand jet across the width of the barrel. The sand stream is provided by a sand pressure tank situated at the side of the machine, and no rubber piping is used in connecting to the nozzle. A mechanically-driven bucket elevator returns the spent sand to the sand pressure tank, where it is effectively sifted before going forward again to the nozzle. The cleaning of the castings is automatic and the sand circuit is continuous.

Rotary-table Sand-blast Machine. — This machine has a slowly-turning table driven by bevel gears, which are enclosed, and supported by a dust-proof step bearing. Moving nozzles, blowing from above, ensure a complete distribution of the sand blast over the table surface. The sand pressure tank is mounted directly above the table, the length of feed piping being thus reduced to a minimum. No rubber piping is used. The spent sand, falling through the table grating, is returned to the sand pressure tank by a mechanically-driven bucket elevator, and is effectively sifted by a sieve at the pressure tank. The front of the table is available for removing cleaned castings and replacing them with fresh ones while the sand blasting is in operation, so that the whole operation is continuous.

Moulding-sand Sieving and Mixing Machine.—This machine, of the transportable type, is complete with electric motor and is self-contained. It is constructed on a new principle, which ensures a thorough mixing and aeration of the sand, and this is obtained with low-power consumption and with the minimum of friction. The machine consists essentially of a shaking sieve, a bladed mixing drum, a mixing chamber and the necessary gearing and electric motor. The whole is mounted on a wheeled framework of barrow-like construction. The sand is discharged from the side of the machine, with a throw of up to, roughly, 10 ft. Coarse impurities are separated and side tracked at the sieve, and an iron catcher is arranged near the discharge opening for arresting any small iron splinters, pins, etc.

The firm possess establishments at Castle Lane, Warwick, and 150, Holborn, London, E.C.1. Mr. J. W. Porter and Mr. A. Clayton have charge of the Stand.

Mastabar Belt Fastener Company.—No exhibition would be complete without a stand showing this well-known and useful device. Numerous exhibiting firms throughout Great Britain have had recourse to the experts attached to the Stand to help them to get their machinery in motion. The firm rightly insist that a belt is no better than the fastener, and the method demonstrated on the Stand shows it to be of outstanding merit. The general manager, Mr. W. Cookson Uff, and Mr. L. Norman, the London representative, are taking charge of the Stand.

The head office is at 14A, Blackfriars Street, Manchester, and the works are at Heckmondwike, Yorkshire.

Denbigh Engineering Company, Limited.—This firm is showing a type of moulding machine that is definitely unique in both conception and design. The Denbigh moulding machines are hand-actuated jolt-ramming machines, so excellently balanced are all the loads, within the range of the machine, that the effort required for jolting is totally independent. All moving parts have been designed so as to eliminate friction, ball-bearing rollers having been inserted as guides to give free-oscillating movement to the machine table. For stripping the mould from the pattern plate, a ratchet mechanism has been incorporated.

Another most important feature of these machines is that the first two sizes can be made portable if desired, and this enables a system of moulding that undoubtedly proves a distinct time-economiser. This system has been adopted by the Denbigh concern in their own foundry, and resolves itself into stacking boxes, in lots of 12 pairs, at intervals of space they will occupy when made up ready for casting. This gives, say, for 72 boxes six stacks at the required spacing. The operator moves the machine to the first stack of boxes where there is also a dump of sand at the side, and as the moulds are made he places them immediately behind him and then moves the machine to the next stack and repeats the operation. By this method there is practically no carrying of boxes, and the operator does not have to move many feet throughout the day.

The same system applies when boxes are opened up and again stacked, with sand dump at side of boxes instead of carting sand and boxes to the machine as is necessary with stationary power machines.

This system is made possible by the fact of no power being required and, therefore, no connecting pipes; also no foundations for the two sizes, as mentioned above, being necessary, other than the sand foundry floor.

An exhibit is made of a complete line of cast-iron moulding boxes, of rigid construction and well-designed dowel-and-pin arrangements for properly closing them, with a certainty of eliminating joint lines on the castings.

The Stand is in charge of Mr. Tomkins. The London office is at 11, Queen Victoria Street, E.C., and the works of the Company are situated at Horseley Heath, Tipton, Staffs. These are open for inspection on any working day during the run of the Exhibition.

Constructional Engineering Company, Limited.—Curiously enough, though this is a foundry equipment exhibition, this Stand is the only one showing cupolas. It is quite unique, because for the first time in any exhibition the much-discussed *Poumay Cupola* is being shown. It is represented by a bottom section of 5-ton per hour "Titan" cupola, constructed under licence. This cupola shows the features of the Poumay system. Upwards of 40 cupolas have been built or converted to the Poumay system in the United Kingdom, whilst over 300 have been built or converted on the Continent. Under this system—of which the Constructional Engineering Company, Limited, have the sole manufacturing rights—coke economies, varying from 20 to 60 per cent., have been effected. The coke consumption is guaranteed by the licensees. It is interesting to note that several repeat orders have been received for cupolas to this system.

The "*Titan*" *Cupola.*—Here, again, a bottom section of "Titan" standard cupola, having a melting capacity of 3 tons of metal per hour, is being shown. The patented and other features embodied in the design of this cupola include special tuyeres, independently adjustable from outside air belt. There is an inspection door giving full access to each tuyere, and separate sight hole and poking hole are incorporated in the inspection door. This feature enables the cupola operator to clean out a tuyere without danger of the escaping blast striking his face. Cleaning-out doors are also fitted on underside of belt with fusible plugs. The air belt is welded throughout and fitted with conical top. An alternative type of tuyere, known as the "drop" type, is also shown. This tuyere is fitted with fusible plug and an inspection door incorporating separate sight holes, etc. Upwards of 1,600 "Titan" cupolas have now been built.

No exhibit of this Company would be complete without a cupolette, and a No. 1 "Titan" has been incorporated. It is a small, yet complete, melting unit, with a capacity of 10 cwts. per hour, lined with firebricks and complete with fan. The cupolette is of the drop-bottom type, complete with fettling door, slagging and tapping spout and blast-regulating valves and pipes. It is interesting to note that over 1,000 "Titan" cupolettes are in use in foundries, engineering shops, etc., at home and abroad.

Shaking Barrel.—This is of the latest friction-driven type, wherein the barrel is separate from the machine and, therefore, portable. It can be filled in the foundry, carried to the machine and after rumbling the barrel can be taken to the fettling shop and emptied; the one machine can thus be used for three or more barrels.

The latest type of "*Titan*" *Mechanical Riddle* has been arranged to take any standard riddle or sieve. It is self-contained and complete with an electric motor.

The "*Titan*" *Tumbling Barrel* is fitted with a raising and lowering device, which is hand-wheel operated from the front, complete with fast and loose pulleys. The barrel is of mild steel and is particularly suitable for light cast-

ings, both ferrous and non-ferrous. This type is self-emptying.

A material exhibited for the first time is "Titanite"—a new patternmaking material. Over 20 sample pattern plates and oddsides made of "Titanite" are shown. "Titanite" is suitable for making any pattern plates ordinarily made in metal. Amongst the smaller specialities should be noted the samples of sand-blast shot, both round and cornered.

Ladles.—Two types of these are shown. Primarily there is a one-ton-capacity receiving ladle, having a tea-pot spout, mounted on a standard and fitted with wheels. This ladle has all the advantages of a receiver without corresponding disadvantages. The second is a geared-crane ladle of the latest type. Additionally, there is a range of pressed-steel ladles on exhibit.

Sand Dryer.—Another interesting feature of this Stand is the "Titan" sand dryer, designed for drying sea sand and capable of handling two tons per hour.

No cupola is considered complete to-day without a *Blast Meter*, and two types of volume-pressure indicators for measuring the volume of air are incorporated in the exhibit. The final exhibit to be reviewed is a "Titan" core stove, arranged for coke or gas firing, and having special trays and framework for carrying the cores. As a tray is withdrawn for filling or emptying, the back of the tray automatically closes the stove.

The head office of this Company is at Titan Works, Charles Henry Street, Birmingham. Mr. D. H. Wood, the managing director, is personally in attendance at the Stand.

David Colville & Sons, Limited.—This well-known firm of ironmasters and steel manufacturers have created an exhibit of outstanding interest to ironfounders. They, naturally, show samples of "Dalzell" brands of Scotch foundry pig-iron, made at the Glengarnock Works. These are shown both in the form of pigs, as cast, and as a series of fractures, showing "Dalzell" Nos. 1, 2, 3 and 4 qualities foundry iron which are suitable for the production of all classes of castings. These are specially suitable for engineering and other high-grade castings, such as cylinders for gas and oil engines, and can be supplied to any required specification.

Samples and fractures of special refined pig-iron, the special feature of which is its low carbon content, often as low as 2.8 per cent. This iron is definitely suitable for obtaining low-carbon cast iron for castings such as used for Diesel engines. Several specimens of castings are shown which have been made from mixtures of this iron and show the high quality of the castings obtained by its use.

A very interesting chart, indicating the operations in a Scotch blast furnace is shown.

The head office is situated at 195, West George Street, Glasgow, C.2, and district offices have been established at 6, Spring Gardens, Cockspur Street, London, S.W.1; 147, Corporation Street, Birmingham; 1, Dickinson Street, Manchester; 319, New India Buildings, Water Street, Liverpool; and 109, Pilgrim, Street, Newcastle. In addition to these, there are two special agents in Great Britain, Messrs. H. G. Sommerfield, Limited, Charterhouse Chambers, Charterhouse Square, London, E.C.1, for London and Southern Counties; and Messrs. J. C. Abbott & Company, Limited, Lloyds Bank Chambers, New Street, Birmingham, for Birmingham and district.

The firm possess three works, the Dalzell Steel and Iron Works, Motherwell; Clydebride Steel Works, Cambusland; and Glengarnock Iron and Steel Works, Glengarnock.

Bureau of Information on Nickel, Limited.—The Stand of the Bureau of Information on Nickel is designed to illustrate the various applications of nickel in ferrous and non-ferrous castings, and the exhibits are arranged in the following sections—nickel cast iron, nickel non-ferrous alloys; nickel in heat- and corrosion-resisting alloys and nickel-alloy steel.

Undoubtedly one of the most remarkable recent developments in the use of nickel lies in its application in cast iron. It has been established that small additions of nickel made under favourable circumstances have a very beneficial influence on the iron, resulting in greater strength, soundness and density, hardness and wear resistance in the finished casting.

The development of nickel cast iron has been largely based on the remarkable equalisation in structure and hardness which is obtained between thick and thin sections of a casting. This property of the nickel iron has very far-reaching results, for, in the first place, it gives the foundryman an iron possessing a much greater latitude, eliminating waste and defective castings on account of hard spots in machining, on the one hand, and, on the other hand, in the elimination of trouble with openness and porosity in difficult castings. (Fig. 1 shows a typical case: When the iron for the piston was controlled to give ready machinability, then porosity in the boss occurred, as shown in the right-hand casting. A uniformly-machinable piston, with sound bosses, is regularly obtained by the use of a nickel cast iron (left hand).) Success in the application of nickel in cast iron is in great part due to the development of a low melting-point shot, "F" shot, which can be added to the iron as it leaves the melting furnace.

The exhibits illustrate the technology and uses of the newly-developed alloy irons:—Automobile castings for wear resistance, pressure castings, die blocks and engineering castings. Other castings illustrate the use of nickel in improving production in the foundry and machine-shop:—Small castings of complicated and varying section, and castings which are liable to give trouble with porosity or through hard spots in machining, or through cracking and similar troubles.

Under special circumstances, nickel is used in the production of high-quality heat-resisting iron, of corrosion-resisting castings and in the manufacture of non-magnetic iron, examples of which are found amongst the Bureau exhibits.

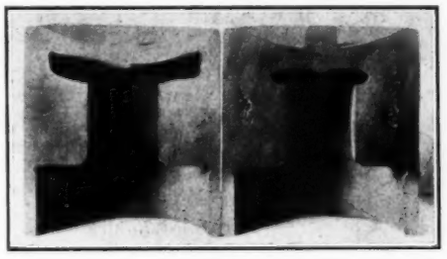


FIG. 1.—NICKEL IN PISTON POTS—B.I.N., LIMITED.

The non-ferrous section includes samples which illustrate some of the applications of cast Monel metal, nickel brass and bronze, "Y" alloy, etc. The development of the use of nickel in heat- and corrosion-resisting alloys is being rapidly extended, particularly in conjunction with chromium. Samples of nickel-chromium alloys and austenitic nickel-chromium steels, illustrating the applications of such materials on account of their heat- and corrosion-resisting properties, respectively, are exhibited. Nickel-steel castings, representing a field of rapidly-increasing importance, are also exhibited.

A full range of the Bureau publications, including bulletins (of which eleven have been so far issued) and data sheets, on the properties and uses of nickel and its alloys, is available at the Stand on application. Dr. A. B. Everest and Mr. T. J. Tingley and other metallurgists are in attendance to give information on any subject concerning nickel.

The offices of the Bureau are situated at 2, Metal Exchange Buildings, Leadenhall Avenue, London, E.C.3.

Pneulec, Limited.—As representative of their line of equipment, the above Company are demonstrating Pneulec Royer sand-mixing machines and an electric swing grinder.

The Pneulec Royer is too well known to need introduction, and we are informed that there are now well over 900 of these machines in use in various parts of the world. It is claimed for this machine that, due to the method of operation, practically any grade of sand can be treated, and that the adaptability of the machine is such that most foundries can use a machine to advantage. The sand is fed into the hopper of the machine, in which is moving at a surface speed of 900 ft. per min. a special steel-toothed belt. The steel teeth have a combing action on the sand and lumps are broken down, bonding material and moisture evenly distributed and scrap separated. The belt is not working in a confined space, so that the intense wear and tear set up by caked sand and scrap, which is common to machines of the enclosed type, is obviated. In addition to adaptability, another important feature of the machine is low-power consumption. The No. 1 size, which is fitted with a 1-h.p. motor and treats sand at the rate of 300 lbs. per min., consumes only 0.7 h.p., and the No. 2, with a capacity of 500 lbs. per min., is fitted with a 2-h.p. motor, and consumes only 1.25 h.p.

FIG. 2.—THE PNEULEC SWING GRINDER.

The Pneulec electric swing grinder is of substantial construction, and designed to stand up to hard service to which a machine of this kind is subject. The grinder body is in C.I., with a motor at the one end driving the wheel at the opposite end through a carbon-steel shaft. The shaft is running in ball bearings and the wheel revolves at right angles to the motor shaft. Coupled in this way there are no belts, etc., so that the machine has a good, clean cut outline, which is desirable for dressing-shop use. The motor fitted is of the totally-enclosed type, and either A.C. or D.C. can be accommodated. The grinder can be supplied either with or without the M.S. supporting pillar. This pillar has a revolving head and considerably increases the adaptability of the machine. The swing grinder is a machine which immediately justifies its inclusion in any dressing shop where the casting cannot be easily held up to the wheel, and the labour- and time-saving advantages of a machine of this type has an immediate effect on the output from the shop.

Mr. Lines and Mr. Smith, of Pneulec, will be in attendance during the whole of the Exhibition, and also Mr. Ringle and Mr. Kaveney, of the Herman Pneumatic Machine Company, Pittsburgh. We understand that Pneulec have acquired the sole rights for the Herman plain jolt, jolt strip and jolt rollover machines for the English market; have arranged for Herman men to be available in order to give first-hand information on how their machines are being used in America.

Another interesting addition to the line of equipment offered by Pneulec is Bartlett-Snow sand-handling and conditioning plant. Bartlett-Snow have an international reputation for

plants of this kind in America, and the experience they have gained over many years in this class of business is now available for English founders. Pneulec have the sole-manufacturing and selling rights for this country.

The head office and works are situated at Mafeking Road, Smethwick, near Birmingham.

Thomas & Bishop, Limited.—This firm is demonstrating "*Cling-Surface*" *Belt Treatment* by running a plant on which they make a test, and compare a belt treated with their material and a belt running under ordinary conditions. Engineers are always interested in this demonstration because it shows a practical result.

Other specialties shown are:—"*Permac*" *Metal-to-Metal Jointing Material.*—This material is rapidly superseding the expensive sheet asbestos and rubber-jointing materials which have been on the market for many years. The firm claim to join metal to metal; make and break a joint and hold up under any temperatures and pressures which the pipes themselves will withstand.

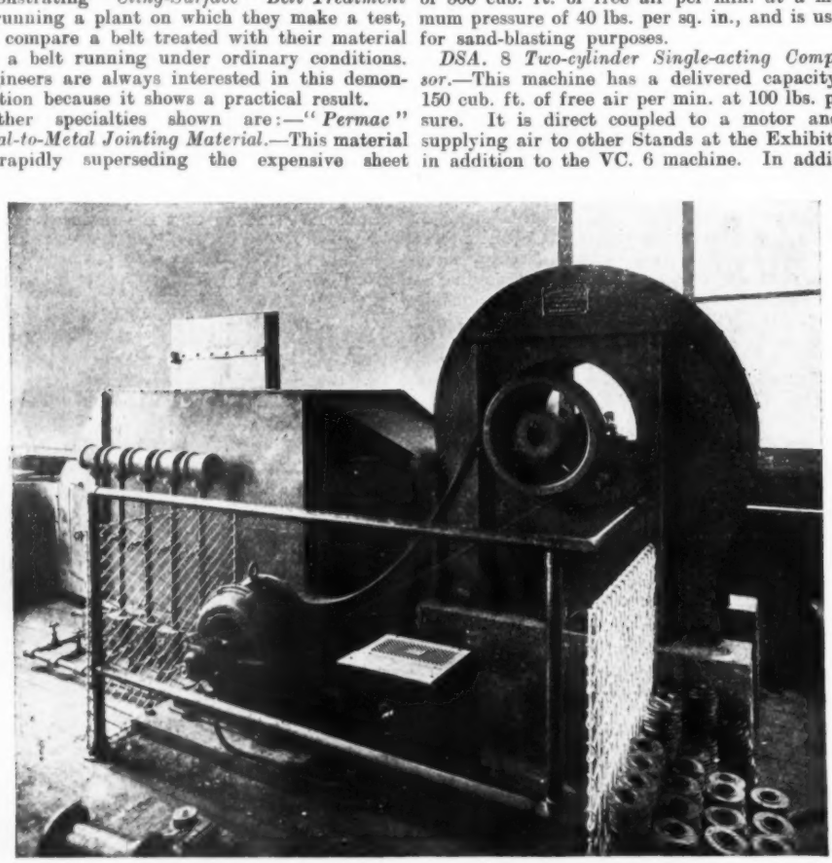


Fig. 3.—Showing the Gripping Effect of "Cling Surface."

"*Flexo*" *Refractory Cements.*—Of more intimate interest to founders are three types of bonding cement which are used in connection with furnace work. "Flexo A" is used for high temperatures; "Flexo B" for low-temperature work and "Flexo C" for bonding and repairing silica bricks.

"*Flexo*" *Tinning Compound* illustrates a commodity which is being extensively used in works and repair shops, as it cleans and tins all dirty metals in one operation.

"*Flexo*" *Lubricating Greases.*—Of these, nine densities of lubricating grease are available—a density for every type of bearing.

The head office is situated at 37, Tabernacle Street, London, E.C.2, with branch establishments at 223, County Chambers, Corporation Street, Birmingham, and 95, Bath Street, Glasgow, C.2, augmented by offices in Paris, Cologne, Milan, Rotterdam and Calcutta.

Reavel & Company, Limited.—A *VC. 6 Vertical Two-stage Compressor* is the exhibit of primary importance to founders. It is a two-stage machine with intercooler and forced lubrication, having a maximum capacity of 500 cub. ft. of free air per min., at 120 lbs. per sq. in. pressure. This machine is useful in general workshop and foundry purposes, including hoists, pneumatic tools, etc. At the exhibition it is driven by belt from an electric motor, controlled by automatic-switch gear, and supplies air to other exhibitors.

VS. 1/6 Vertical Single-stage Double-acting Compressor.—This machine, which is provided with forced lubrication, has a delivered capacity of 500 cub. ft. of free air per min. at a maximum pressure of 40 lbs. per sq. in., and is useful for sand-blasting purposes.

DSA. 8 Two-cylinder Single-acting Compressor.—This machine has a delivered capacity of 150 cub. ft. of free air per min. at 100 lbs. pressure. It is direct coupled to a motor and is supplying air to other Stands at the Exhibition, in addition to the VC. 6 machine. In addition to these there are a number of vertical single-acting compressors being exhibited. These machines are suitable for 100 lbs. per sq. in. pressure.

A *Wr. 8 by 12 Water-cooled Rotary Compressor* completes the exhibits entering into this category. It has a capacity of approximately 400 cub. ft. of free air per min., the maximum working pressure being 35 lbs. per sq. in., and is suitable for sand-blast work.

A 6-in. cylinder pattern hoist is being shown, with a lifting capacity of 2,000 lbs., whilst a variety of pneumatic tools, including concrete breakers, picks, chipping hammers and sand rammers, complete an exhibit of paramount interest to all founders.

The head office is at Ranelagh Works, Ipswich, whilst the London office is situated at 47, Victoria Street, London, S.W.1. Mr. R. L. Quertier, B.Sc., the manager of this office and a director of the Company, is to take charge of the Stand. The directorate have kindly consented to open their works during the run of the Exhibition on application to Mr. Quertier.

Consett Iron Company, Limited.—Artistically housed in a central position, this Stand displays a useful range of raw materials for the foundry trade. There are neat piles of two types of foundry coke, one of which is the well-known and much appreciated "Garesfield" beehive variety. Foreign visitors should be much attracted by this, as we have never encountered on the Continent nicer-looking coke. The second is Consett patent foundry coke. Two types of refractory bricks are shown—Bute and Delves. The foundry industry appreciates the research work this concern has carried out, and will be interested to note its incorporation into the final product. A range of pig-irons is shown, whilst their utility is illustrated by a number of light and heavy castings made from them. The company's extensive works are located at Consett, County Durham, and no doubt can be inspected by arrangement with the management.

E. A. Herbert & Company (Birmingham), Limited.—This firm is showing a range of special alloys as manufactured by Messrs. Alloys & Products, Inc., of New York City, U.S.A., for whom they are the sole concessionnaires for United Kingdom and Northern Ireland.

Amongst the "Alpro" Special Alloys there should be noted a *Yellow Brass Fluidiser.* The purpose of this alloy is to improve the life of yellow brass mixtures, such as are run into ornamental types of castings, usually of thin sections, where clean surfaces and sharp outlines are essential.

Pure Copper Degasifying Alloy.—This alloy is designed for making pure copper castings in which the copper content will exceed 99.75 per cent., and which will show an electrical conductivity in excess of 80 per cent. It is also a deoxidising, degasifying and desulphurising agent for all types of copper-base compositions.

Deoxidising and Densifying Alloy.—This alloy is designed to impart a close-grained structure to those copper-base compositions that are used in castings which must be pressure tight. It is used in plumbing goods, valves, injectors, lubricators, meters, pump housings and pressure castings generally.

Nickel Degasifying Alloy.—This alloy is designed for use in all types of nickel-base alloys and copper-base alloys containing high percentages of nickel to impart fluidity and to rid the bath of the various gases that are invariably present in these classes of alloys.

Manganese-Bronze Hardener.—This alloy is designed to simplify the procedure for making high-quality manganese-bronze. From its use a manganese-bronze, having a tensile strength in excess of 35.7 tons per sq. in., with an elongation of 25 per cent. in 2 in., can be uniformly produced.

50/50 Cupro-Nickel Rich Alloy.—This alloy is designed to facilitate the introduction of the nickel content into nickel silver, nickel bronze and all types of copper-base compositions containing nickel; also for introducing small percentages of nickel into the standard copper-base compositions to improve their physical properties.

Red Composition Densifying Alloy.—This alloy is designed for use in all types of copper-base compositions used to withstand pressure, wherein density of structure is a factor of prime importance. Its use insures a denser and more uniform structure, with increased strength and toughness, enabling castings to withstand higher pressures without sweating and without rupture. It will also improve machining properties.

High-duty Bronze General-improver Alloy.—This alloy is designed for use in all types of the copper-tin bronzes to increase their desirable physical properties, at the same time improving machining properties. It is especially helpful in pressure castings, bearings and bushings, also bronze gear blanks in raising their physical properties to adapt them for heavy-duty work. It improves the central portions of heavy cross-sections, making the strength of such sections equal to that of the surface metal.

Grey Iron Improver Alloy.—This alloy is designed to be added to the ordinary grey iron, and small additions will materially increase tensile strength, transverse strength, density of structure and ability to resist corrosion. It will also make a considerable increase in hardness, at the same time making a marked improvement in the machining properties. It is designed for ladle addition only and is readily soluble in molten iron.

The firm have offices at 35, Summer Hill Street, Birmingham, and 104, High Holborn, London, W.C.1.

Wadkin & Company.—The chief exhibit of this Stand was the *Wadkin Pattern Milling Machine*, Model W.H., a machine in which these manufacturers have specialised for over 30 years. This machine is seen in the illustration, Fig. 4. There is practically no woodworking operation that cannot be done on this machine. Intricate patterns and core boxes can be made in a fraction of the time originally required. In construction the machine embodies every conceivable mechanical advantage and it is one that need never be idle in any pattern shop of medium size. The machine consists of a main frame carrying an overhanging arm, which is raised and lowered both by hand and power motion. The spindle head is carried on the arm and the spindle may be operated horizontally, vertically or at any intermediate angle desired to suit the particular work in hand.

The principal angles of the swivelling motion are marked, and a taper spring-plunger pin is provided to index the position. Intermediate angles are secured by a locking handle. Heavy ball bearings support and take the thrust of the spindle. The starting, stopping, and reversing of the cutter spindle are controlled from a hand wheel at the end of an overhanging arm. The work table has longitudinal and transverse motions, and in addition is capable of being rotated for all kinds of circular and radius work. A runway is provided upon which the whole table may be easily moved longitudinally to enable either large or small work to be rapidly machined.

The compound movement of the table is one of the most profitable features of the machine, as, apart from allowing of a large scope of working, in many cases eliminates the necessity of resetting the work when once it has been secured to the table. Spring and dead stops are fitted to the sliding motions, and standard and contraction scales provided whereby the limits of the movements may be properly set. This simplifies greatly the operation of the machine. An outstanding feature of special value is the ease and speed with which the machine may be changed over from one operation to another. This allows the smallest jobs, previously considered not worth setting up for, being rapidly done on the machine. Three speeds are provided to the cutting tool by means of a change-speed gear box.

The method of driving the spindle is by a fast and loose pulley on the gear-box shaft and an endless laminated belt which passes up the inside of the column to two pulleys, either of which may be engaged through the clutch, with a horizontal shaft extending along the inside of the overhanging arm. On the end of this shaft the spindle is driven through spiral-gear wheels. This machine is very popular with pattern-makers all over the world, and has been supplied to the leading railway companies' engineering shops, shipbuilding companies, etc., the world over. One British firm alone has taken nineteen machines, whilst repeat orders have been received from a dozen or more of the most important American concerns. The machine will be in constant operation during the Exhibition, and the intricate patternmaking and core-box making operations will be done by the machinists in attendance.

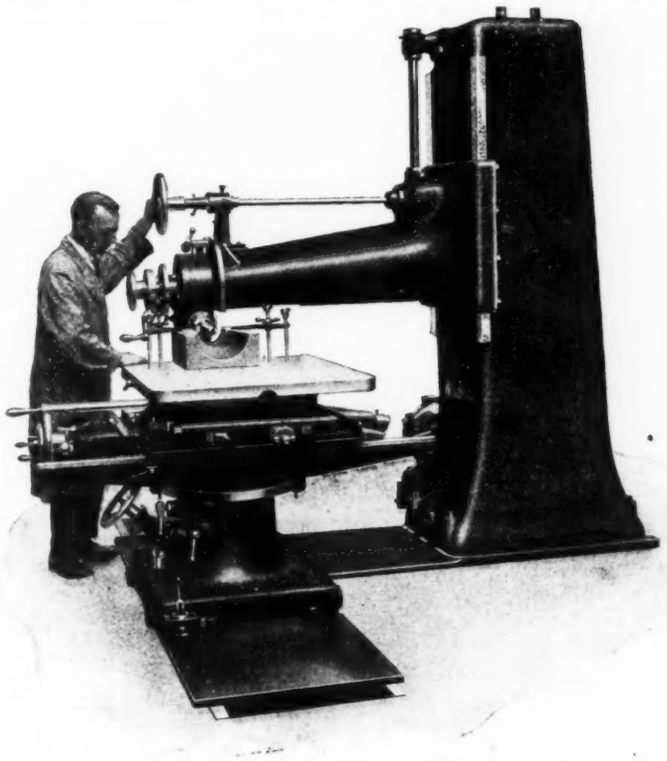


FIG. 4.—WADKIN PATTERN MILLING MACHINE.

The second machine on the Stand is the *Wadkin Vertical Bobbin Sander*—a type of machine that should be included in every pattern-shop equipment. The amount of hand chiselling and planing work that this machine can make unnecessary is remarkable. It will deal with light or heavy work of any conceivable shape in such a speedy and efficient manner that hand sanding cannot be compared on the grounds of cost, whilst the high speeds which are possible make the finished work equal to that done by hand. The machine is entirely self-contained, no countershaft being required. The vertical bobbin, to which the sandpaper is attached is carried in a sliding frame, which is arranged to reciprocate vertically. This reciprocating motion is an essential feature of the production of high-class work. The bobbin spindle is carried on ball bearings. The table through which the bobbin protrudes is arranged to cant 30 deg. below and 15 deg. above horizontal and may be locked in any desired position. The table is arranged with adjustable plates to enable various diameters of bobbins being used.

In addition to the two foregoing machines, there is on exhibition a small electrically-driven 6-in. hand-feed planer. These small machines are very suitable for placing close by the patternmakers in order to eliminate hand work to the fullest extent. In every pattern shop there is much planing work that is considered too small to take to the big planer and, in consequence, hand planes are in constant use. This, in comparison with machine planing, is both slow and costly, and 90 per cent. of the work can be eliminated by the use of these small machines. This small machine will be seen running.

The head office of Wadkin's is situated at Green Lane Works, North Evington, Leicester. Mr. J. H. Goddard, the proprietor, is personally taking charge of the Stand, and has consented to throw open his works for inspection during the run of the Exhibition.

British Pigirons, Limited.—This firm is the pioneer concern for the supply of pig-iron to definite analysis, coupled with the appropriate fracture. The popularity of these virgin slow-smelted pig-irons is a vindication of the policy initiated. On the Stand they show typical fractures, microphotographs and test-pieces of Midhill & Glenhill special pig-irons. These irons are made at Newcastle, in Staffordshire. British Pigirons, Limited, have their head office at Abbey House, 2, Victoria Street, London, S.W., and a branch at 46 rue de la Bienfaisance, Paris 8. The personnel on the Stand is comprised of Mr. G. B. Tavernor, Mr. J. H. Baker and Mr. E. C. O'Brien, with whom will be associated several foreign representatives.

Pattern Shop Supplies Company.—On this Stand is to be found the daily requisites of the pattern shop. Though "Everything for the Pattern Shop" is the slogan of this concern, attention should be given to the range of leather fillets offered, which are manufactured at the Company's works at 309, New King's Road, Fulham, London, S.W.6. Mr. A. C. Harrison, the proprietor of the concern, is personally taking charge of the Stand.

Major, Robinson & Company, Limited.—The various specialities exhibited by this firm will no doubt be of interest to all engaged in the foundry and allied trades.

"*Scols*" *Iron and Steel Cements.*—These cements have now been marketed since 1904, and there is every indication—owing to the increased sales—that they have given every satisfaction. We note that since the last Foundry Trades Exhibition they still show enterprise by grading their cements under the heading of "A," "B" and "C" Grades, thus providing for the requirements of foundries, shipbuilders, gasworks, boilermakers, engineering works, plumbers, garages, etc.

"*Scols*" *Aluminium Filling* for aluminium castings. This will interest founders engaged in making aluminium-alloy castings.

"*Scols*" *Tube-bending Machines.*—All those interested in tube bending should visit this Stand to see the display of bending machines; all sizes of gas, steam and hydraulic tubes, up to 3-in. bore, can be bent without heating or loading; also there are tube benders for light- and heavy-gauge copper tubes up to 1¼ in. dia. An interesting assortment of bent tubes in various metals will be shown.

"*Scols*" *Elastic Cement* for boilermakers, etc., is used for treating the inside seams of boilers and tanks, and repairing all kinds of leaks, also fractures and boiler patches.

"*Scols*" *Graphite and Asbestos Pipe-joint Compounds* for pipe fitters, engineers, gas companies, etc., make perfectly-tight joints in steam, gas, air or water pipes, tanks, connections, etc. They do not contain lead or any other injurious materials.

The Stand is in charge of Mr. J. E. Jackson and Mr. F. P. McManus. The works are situated at 385 and 387, City Road, Cornbrook, Manchester.

Sir W. G. Armstrong, Whitworth & Company, Limited.—The Stand of this well-known Tyneside firm is mainly devoted to three lines of special interest to the foundry trades.

A.W. Pneumatic Tools.—The design of these tools is based on the extensive practical experience gained by the firm in their own works and shipyards. They are characterised by extreme simplicity and robust construction, coupled with high efficiency and a minimum of vibration. The range includes chipping and fettling tools, sand rammers, sand riddles, blow guns and other tools of especial interest to the foundry trades.

A.W. Refined Pig-iron.—These irons are the outcome of considerable research, the object of which was to obtain stock-irons of known chemical composition from which clean solid castings of definite physical characteristics, *i.e.*, strength, toughness, texture, resistance to wear,

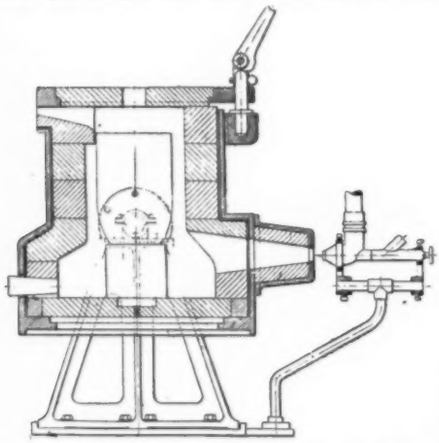


Fig. 5.—Section of Monometer Oil-Fired Furnace.

etc., could be produced. There are four standard grades which are suitable for a wide range of purposes. Messrs. Kittel & Company, of 5, Fenchurch Street, London, E.C.3, are the sole overseas agents for this product.

Monometer Products:

There is also showing the complete range of machinery and furnaces, etc., which they produce for the Monometer Manufacturing Company (1918), Limited. These specialities include Monometer patent pressure die-casting ma-

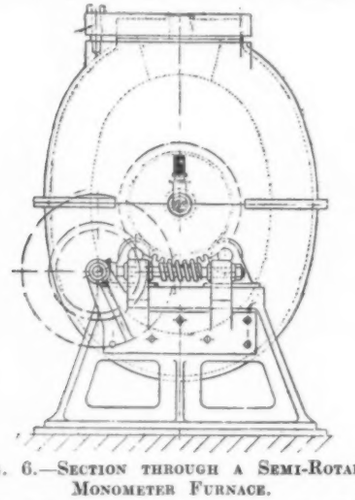


Fig. 6.—Section through a Semi-Rotary Monometer Furnace.

chines, Monometer patent gas- and oil-fired furnaces for every industrial purpose, and "Monard" case-hardening compounds. The Monometer furnaces, which are constructed on the most scientific and up-to-date lines, are highly efficient in use, and embody interesting antioxidation features and precise methods of temperature control.

Transporting Machinery & Engineering Company, Limited.—The principal exhibit on this Stand is the T.M.E.C. all-steel totally-enclosed electric Micro hoist block, which has been designed particularly with regard to foundry practice. The model on view is erected and in working order, demonstrations of which will be continued during the period of the Exhibition. The T.M.E.C. Micro block follows in design the

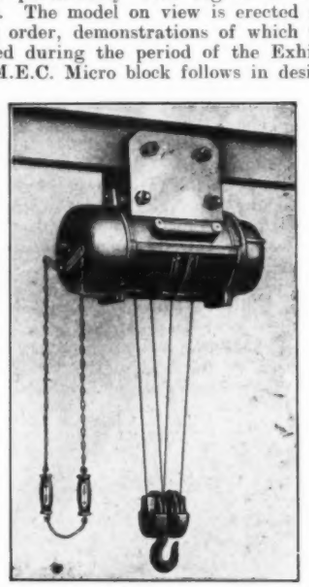


Fig. 7.—T.M.E.C. Girder-Travelling Block.

standard T.M.E.C. electric hoist blocks, but embodies a two-speed arrangement, with a creeping speed to provide a steady and very slow lift where very careful handling is required, such as in the raising of mould boxes, core boxes, etc., whilst the second speed is that of an ordinary electric crane. The design of the machine is particularly simple and its operation is entirely fool-proof. Being totally enclosed it is eminently suitable for dusty, dirty or damp conditions, such as may exist in a foundry. The transmission gears being housed in a sealed gear box, which is filled with oil, attention to lubrication is rendered a matter which need only be undertaken at very long intervals of time.

Fig. 8.—T.M.E.C. Block in Use for Loading.

The motors, *i.e.*, the main hoisting motor and the Micro or Micro-speed motor, are both totally enclosed and protected, and are operated by two separate oil-immersed drum-type controllers. These controllers may be operated simultaneously or separately, according to the desired speed of lift on the load hook. Automatic electro-magnetic sustaining brake is provided on the main hoisting motion, while an automatic mechanically-interconnected brake is provided on the Micro motion. Adjustments in the latter are automatic, as it is of the metal-to-metal-cone type. These machines are made to lift loads from 10 cwts. up to 5 tons, whilst special machines, having capacities up to 10 tons, are also constructed according to the same design.

Eye-suspension machines are particularly adaptable to suspension from existing cranes, whether they are hand-operated or electrically-operated, thus rendering an ordinary crane capable of dealing with all classes of foundry work and providing it with a creeping speed. The design of the cast-steel end frames of each of the machines incorporates four feet, on which the block may be rested, these are for the purpose of the conversion of existing overhead hand-crane crabs so that, at a fraction of the cost of the standard electric overhead creeper crane, existing hand overhead cranes can be converted and the foundry provided with the most modern electric-lifting gear.

In addition to the Micro block, which, of course, has been specially designed for foundries, a complete range of the T.M.E.C. all-steel totally-enclosed electric hoist blocks are in operation. These machines are made to lift loads from 2½ cwts. up to 5 tons, larger machines being manufactured to special requirements. They are

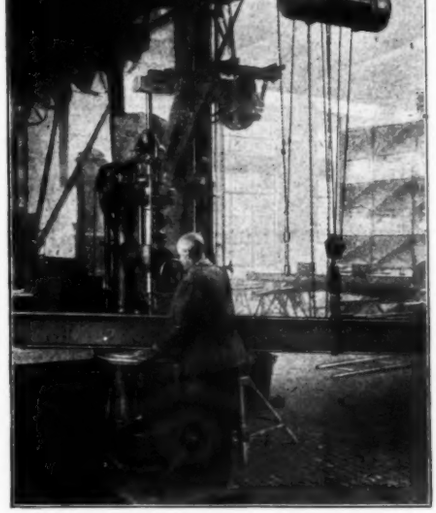


Fig. 9.—T.M.E.C. Block on a Girder Crane.

totally enclosed with oil-immersed controllers, transmission gears running in a sealed oil bath, adjustable automatic resetting limit switch gear, to prevent overwinding in either direction, with automatic brakes, thus calling for no particular skill in their operation. Fig. 7 shows the general design of the girder-travelling block, equipped either for push travel or hand-chained-geared travel. Fig. 8 illustrates an application of these hoist blocks to an engineering shop; while Fig. 9 shows a T.M.E.C. block specially arranged on a girder crane. As winch blocks for bolting to a wall, floor or roof, an example is on view, while a machine dismantled is open for inspection.

In addition to these lifting appliances, the T.M.E.C. hand-lift trucks, of which there are 30 standard models, are represented by the special foundry model. This truck is provided with leaf-spring and hand-elevating gear, and is designed to work in connection with numbers of stillages, thus the tying-up of numerous trucks during the period of loading or unloading is eliminated, as the truck merely places down the stillage or platform at any desired point and is immediately taken away to lift a similar platform. The Lizard electric truck is also on view, the type exhibited being a type eminently suitable for foundry or rough ground work. These vehicles are designed to lift loads up to 2 tons.

The head office of the Company is located at 76, Victoria Street, London, S.W.1. Mr. G. H. Wright hopes personally to spend much time at the Stand during the run of the Exhibition.

Wm. C. Pantin.—Exhibits of the type seen on this Stand are becoming of increasing importance to the foundry owner every year. Conveyors are only just becoming to be appreciated by the industry and the gravity system is one which makes a strong appeal owing to the absence of power costs and low upkeep.

Matthews' Gravity Roller conveyor is designed for conveying moulds and the like of various kinds and varying dimensions. It is made in standard 8-ft. sections, each fitted with a patented coupling device. The ball-bearing rollers are of solid-drawn steel tubing and are usually 14 in. long by 2¼ in. in dia., but these measurements vary according to the sizes and weights of the articles to be conveyed. The

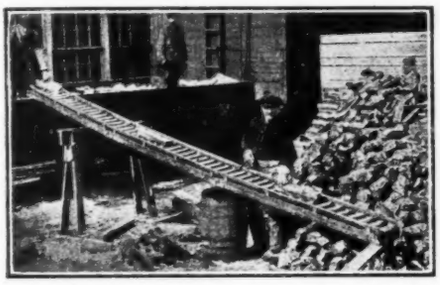


FIG. 10.—PORTABLE LENGTH OF MATTHEWS' GRAVITY ROLLER CONVEYOR UNLOADING PIG-IRON FROM RAILWAY TRUCK TO STORE.

distance apart of the rollers varies from 1¾ in. upwards, depending on the length of the packages, each of which must span at least three rollers. Each section of conveyor is self-contained. It can be supported on special adjustable supports, or fixed supports, or in any other way to suit users' requirements. Curves are fitted with solid-drawn steel-tapered rollers, mounted on the same ball bearings as we fit in the parallel rollers. The tapered rollers ensure boxes keeping their position when turning corners. The curves are reversible, *i.e.*, they can be set to deliver either to the right or left as desired.

Mr. Herbert Pantin and Mr. C. F. C. Vincent will be in attendance at the Stand. The head office of the concern is 147, Upper Thames Street, E.C.4.

E. Leitz (London).—The first exhibit to be noticed on this Stand is the *Leitz Large Metallographic Microscope and Camera*. This well-known apparatus is of the Le Chatelier-Guertier type, and has had important improvements embodied in its construction during recent years. It has a wide range of utility; with suitable lenses, the standard equipment gives a range of magnifications from x20 to 2,000 dias. for visual work and from x10 to several thousand dias. for photography. By means of a macro attachment, large objects may be photographed from ½ natural size to x10 dias., with either vertical or oblique illumination.

The apparatus has several unique features, all combining to give the maximum efficiency with the minimum amount of adjustments. Of particular note is the manner in which the optical bench is suspended from the table stand. This obviates all the effects of vibration and can be put in or out of action by the movement of one lever. An entirely new type of automatic 5-amp. arc lamp is fitted, which is worthy of close inspection, several unique features in this lamp make it an ideal illuminant for photomicrography. Increased intensity, with absolute reliability and freedom from flicker, are obtained, and it will burn for 1½ hours without any attention.

The microscope stand is substantially built and capable of accommodating large and heavy specimens. The vertical illuminator has the prism and plate-glass reflector mounted on one spindle so that they can be instantly interchanged. The condensing system of the apparatus is scientifically designed so that the operator may immediately be assured of having critical illumination with any lenses. By means of two iris diaphragms and suitable condensers the intensity of illumination may be exactly and evenly controlled. Also the area of illumination can be regulated to the actual field of view of the objectives. The camera has an extension of 40 in. and will take ½ or ¼ plates. An observation prism is fitted to the front panel of camera so that the image on focussing screen can be observed from the working position at the centre of stand. A thorough inspection of this apparatus will be appreciated, and specimen photomicrographs taken by it are on view.

Material-testing Microscope. — This compact apparatus is suitable for visual observations, photomicrography and macrophotography. For departmental or use in smalier works it has the advantage of low cost, small amount of bench space required (2 ft. by 1 ft.) and that no aligning and few adjustments are required. The illuminant is a filament lamp, permanently attached to the microscope. The latter is of the inverted type and fitted with mechanical stage. The vertical illuminator takes the form of a triangular polished-metal reflector, which gives the maximum illumination and minimum restriction of objective aperture. The only adjustments necessary are centration of lamp and focussing. It is recommended for photomicrography up to x600 dias. The object stage may be removed and the microscope rotated on its axis and placed direct upon any very large

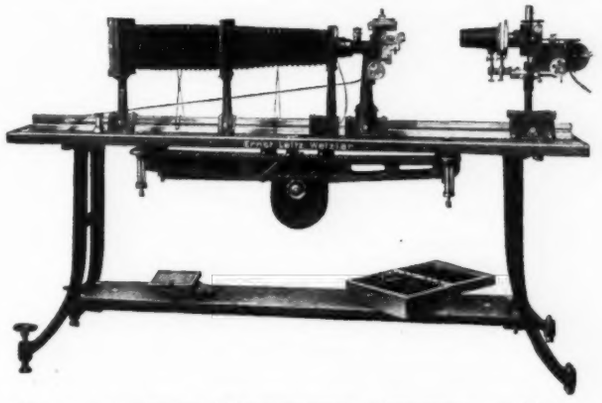


FIG. 11.—A TYPICAL METALLURGICAL MICROSCOPE, BY LEITZ.

objects. The camera takes ¼ plates and has an extension of 16 in., and can be instantly removed when the apparatus is required for visual observation only.

Metallurgical Microscopes.—For visual work there is shown a range of instruments, the most popular being the Model MO. This has all the usual and essential fitments, including a long working distance between objective and stage. It is built on an interchangeable basis, so that the Greenough binocular-microscope body for the examination of fractures and large objects, etc., can be interchanged with the monocular body. Also plain square, revolving and mechanical stages can be interchanged or supplied as desired. In addition, facilities are provided for fitting a substage at any time the instrument may be wanted for use with transmitted light. The vertical illuminator is similar to that fitted to the large metallographic apparatus.

Binocular Magnifiers.—These magnifiers are notable for the large field of view obtained, long working distance and depth of focus. Magnifications from x3 to x30 dias., with field of view from 45 to 8 mm., with working distances from 150 to 80 mm. A variety of stands is obtainable suitable for all classes of work. Other exhibits include a Universal microscope for biological, mineralogical and metallurgical work. New filament microscope lamp for photomicrography, new micro objectives, arc lamp, polishing boards and machines and inexpensive microscopes.

The head office is situated at 20, Mortimer Street, London, W.1. The works are at Wetzlar, whilst the selling organisation is world-wide.

The Electric Steel Castings Company, Limited, Sheffield.—A section of this Stand is taken up by one of the firm's principals—Messrs. Wm. H. Nicholls Company, Inc., 126th Street and 91st Avenue, Richmond Hill, New York, the well-known manufacturers of moulding machines. For the Exhibition they have got together a complete line of production machines, jolt squeezers (fixed and portable); jolt, squeeze-strip machines and jolt-squeeze-strip machines with automatic flask discharge. Several types and sizes will be shown in operation. Manufacturers and sale agents for these machines for Germany, Switzerland and Italy are Société Anonyme des Aciéries ci-devant Georges Fischers, Singen, Germany and Schaffhausen, Switzerland, and for France, Société Anonyme anciens Etablissement, Glaenzer & Perreaud, 18-20, Faubourg du Temple, Paris.

The Rauschenbach Engineering Works, Limited, Schaffhausen, Switzerland, are exhibiting a number of wood-working machines suitable for pattern-making, etc.

Another principal, the Swiss Grinding Wheel Works, Limited, Winterthur, Switzerland, of which the Electric Steel Castings are sole agents, are exhibiting a quantity of grinding wheels, in "Borundum," "Rubis" and "Carborund," specially suitable for iron and steel foundries.

Mr. Wm. H. Nicholls, the president of Wm. H. Nicholls Company, Inc., will be at the Stand during the Exhibition in charge of the moulding machines, and Mr. C. B. Perkins will have charge of the other exhibits, together with technical experts from the works.

The head office of this concern is located at Wentworth Chambers, Pinstone Street, Sheffield.

The Carborundum Company, Limited.—Primarily on this Stand is a range of carborundum refractories, including *Carbofrax* bricks, tiles, special shapes, tubes and muffles. *Carborundum Crucibles*, designed for use in the non-ferrous metal-melting industry. These crucibles possess many advantages, such as long life, no annealing treatment required as they do not absorb moisture, withstand unlimited heat, not affected by being cooled between heats. Of interest to the light-castings industry is a range of *Carbofrax Enamelling Muffles*. They have the advantage of longer life, with low-fuel consumption, giving increased production at low-burning costs, better burned ware, quicker, more uniform distribution of heat.

Another exhibit is an assembly of *Carbofrax Hearth Tiles*, for heat-treatment furnaces, which

stand up under the trying condition of heat-treating heavy articles. They show remarkable resistance to abrasion, will not soften or sag. An essential complementary exhibit is *Carbofrax Refractory Cements* for high-temperature furnace repairs and fixing of Carbofrax bricks.

Carborundum Firesand, a refractory specially suited for the non-ferrous metal industry; *Carborundum*, the well-known refractory material, which when bonded with suitable binder and made into brick and special shapes, known as Carbofrax, it possesses great refractory value, and Carborundum being produced by the intense heat of the electric furnace it cannot be melted, and possesses an extremely low coefficient of expansion, coupled with high thermal conductivity. It will withstand the highest temperatures, resist abrasion, and does not spall or crack under rapid changes of temperature. Their great value in the upkeep of high-temperature furnaces is definitely established.

The works are situated at Trafford Park, Manchester, and their sales organisation is world-wide.

August's Muffle Furnaces, Limited.—This firm is showing a *Laboratory-size Simpson Patent Intensive Sand Mixer*, which is an exact replica in miniature of the well-known Simpson mixer, for mixing foundry sands and the like. The laboratory size, as its name implies, answers the purpose of obtaining representative and accurate sand mixtures on a laboratory scale, which can then be duplicated in the full-size

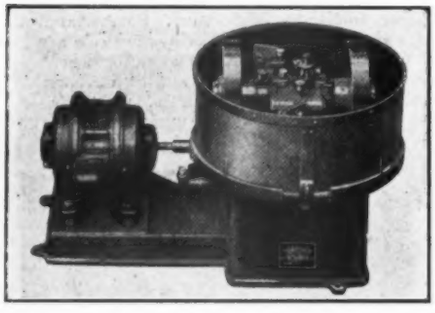


Fig. 12.—Simpson Intensive Sand Mixer, by August's Muffle Furnaces, Limited.

mixer in the foundry. The laboratory-size sand mixer is designed to be a part of the sand-testing equipment of a well-organised foundry. It is also applicable to experimental and research work on the mixing of cements, terra cottas, etc., as well as foundry sands. A second exhibit is the *August Mould Drier*, a well-known apparatus for the drying out of large moulds, *in situ*, on the foundry floor. It operates on the well-known "August" principle of drying by hot air and uses ordinary gas coke as fuel. It is also applicable as a portable heating unit for the drying of small core and mould stoves. The unit is quite complete and fitted with lifting lugs so that it may be easily disposed upon any mould. The hot air is generated by means of a direct motor-driven fan.

The August Portable Drawer-type Core Stoves, which are also being shown, are usually fired by coke (the more popular type), but gas, oil or electrical heated are available in a number of styles, containing various numbers of drawers of varying depths. The drawers are withdrawn by means of an overhead ball-bearing-operated gear, which can be operated by youths or girls.

The final exhibit is a *No. 2 Size Simpson Intensive Sand Mixer*. This is fitted complete with a bucket loader and an August aerator. It is capable of dealing with up to 10 tons of sand per hour. The plant shown mixes and aerates the sand with only one handing of the sand, that is, into the bucket of the bucket loader, whilst the mixed and aerated sand is discharged from the machine direct into crane tubs or wheelbarrows. The plant is equally capable of mixing facing sand, core sand (including oil sands), loam or reconditioning sand. Although the complete plant consists of a sand-mixing machine, a bucket loader or charging device and an aerating machine, yet all three units are driven from the one main shaft and the total power consumption is approximately 10 h.p.

The head office is located at Thorn Tree Works, Exmoor Street, Halifax; the London office is at 93, Charterhouse Chambers, Charterhouse Square, E.C., and the Paris office at 10, rue de Seze.

The works are open for inspection during the run of the Exhibition, and Mr. H. Coggan and Mr. G. E. France, who are available at the Stand, will be pleased to detail arrangements.

Sterling Foundry Specialties, Limited.—This firm is exhibiting a comprehensive selection of their well-known rolled-steel moulding boxes and foundry flasks of various sizes and styles for iron, brass, steel and aluminium foundries, and also a range of Sterling wheelbarrows suitable for foundry purposes. Up-to-date foundrymen recognise the fact that good steel moulding boxes are so infinitely superior to cast-

Fig. 13.—Ordinary Type of "Sterling" Box.

iron or wooden boxes, that the extra cost of steel boxes is much more than justified by the very decided savings brought about by their use. It is a great mistake, however, to buy inferior steel boxes. Modern foundry practice demands moulding boxes that are not only light and easy to handle, but they must be strong and robust in construction to withstand the rough usage of every-day foundry service. Sterling moulding boxes are made from a rolled-steel bar of a special patented section, the shape of which has been designed to afford great strength and rigidity and minimum weight. The lugs and handles and other fittings are all made of malle-

Fig. 14.—Circular Type of Sterling Box.

able iron. It is impossible for Sterling boxes to crack or break.

The Sterling Company have a large department entirely devoted to the production of their boxes, in the manufacture of which great care is taken to ensure accuracy and interchangeability. All parting surfaces are ground level and true, and all pin holes are drilled from accurate jigs. Out of some thirty different standard styles of Sterling boxes we give illustrations of three typical boxes, which will show the general method of construction. Fig. 13 is a rectangular box with double lugs at each end, and illustrates the Sterling standard building-up feature; any number of box sections of this character may be built up in accurate alignment for multi-part moulding. Fig. 14 shows a simple type of circular box for two-part moulding, and Fig. 15 a reinforced circular box for larger sizes up to 48 in. dia.

The Sterling Company quite usually make up special types of boxes in addition to the very large number of standard styles listed, and as an example of special-purpose boxes we show in Fig. 16 a set of boxes designed for producing the 12-ton railway-wagon axlebox castings. The larger pair of boxes is for the bottom-half casting and the smaller pair for the top-half casting. Several thousands of Sterling boxes have been

Fig. 16.—Special Type of Sterling Box.

made in the past six years for this purpose. Full details of every moulding-box order executed are kept on record for future reference, so that subsequent repeat orders, however complicated, may be duplicated accurately. The whole method of manufacture is one that lends itself to rapid production. Large quantities of their special channel-section bar and many thousands of all the necessary standard malleable-iron fittings are always kept in stock. In fact, it is the policy of the Company to render a thoroughly complete and expeditious moulding-box service. As in the moulding-box department, so in the wheelbarrow section. Sterling wheelbarrows cover the whole range of foundry

Fig. 15.—Reinforced Type of Sterling Box.

requirements in this line. Fig. 17 shows a general-purpose all-steel tubular barrow. There are ten different kinds of general-purpose barrows. Also barrows for coke, sand and pig-iron. They are all made on the same general principles, embodying a number of important improvements, such as the ten-spoke wheel, the pre-lubricated axle bearings,

Fig. 17.—Sterling Wheel Barrow.

and the strongly-braced legs fitted with renewable shoes. The Sterling Company's works at Bedford are open for inspection at any time, and visitors are always welcome. Branch offices are maintained in London (13, Victoria Street, S.W.1), Newcastle-on-Tyne (Lawson, Walton & Company, Limited), and Glasgow (Albert Smith & Company).

Powell Duffryn Steam Coal Company, Limited.—The name "Powell Duffryn" needs no introduction to the foundry trade, and it is of significant interest that this Company, controlling as it does a potential output of about ten million tons of coal and nearly half a million tons of coke, has thought fit, through the medium of Stephenson, Clarke & Associated Companies, Limited, who are sole vendors for the products of the Powell Duffryn Company, to exhibit its various grades of coke, together with other commodities produced at the Powell Duffryn Company's By-product Works, Bargoed.

A visit to the Powell Duffryn Stall is well worth while. Foundrymen will be interested in the coke section; the architect, the surveyor, the builder will undoubtedly be attracted by the by-product section, for here is exhibited a new product of coal, under the name of "Presotim." "Presotim" is a wood preservative that can be supplied in practically any colour both for indoor and outdoor decoration.

The coke exhibited includes foundry coke, mineral-separation foundry coke, Great Western foundry coke, coke cobbles, nuts and beans. With regard to the mineral-separation coke, or, as it is known on the market, "M.S." coke, this quality is the result of much careful thought and experiment. It was appreciated a long time ago that one of the chief features in foundry coke was to have a high carbon content, and as low an ash content as possible, and the "M.S." coke is ideal in both these characteristics. The "M.S." coke is made from coal cleaned by the Froth-flotation process.

There has been a growing demand in recent years for sized coke for use in small furnaces, greenhouses, core stoves, mould-drying ovens, etc., and in order to keep abreast of the times, the Powell Duffryn Company have recently installed a most up-to-date sizing and screening plant, and the products of this plant may be seen at the Stall under the headings of "coke cobbles," "coke nuts" and "coke beans."

The source of supply of Powell Duffryn coke is not confined to a single battery, for at Bargoed, where the coke ovens operate, there are four distinct units, consisting of three batteries of 50 ovens each and one battery of 36 ovens. In addition, the Great Western coke is produced at Maritime coke ovens, Pontypridd, where there is installed one single battery of 50 ovens.

The Powell Duffryn Group consists of not only Powell Duffryn coals, but those of Lewis Merthyr, Great Western, Rhymney Iron Company and Windsor coals, and Messrs. Stephenson, Clarke & Associated Companies, Limited, are the sole vendors for all these products.

The registered offices of the Company are at 101, Leadenhall Street, London, E.C.3.

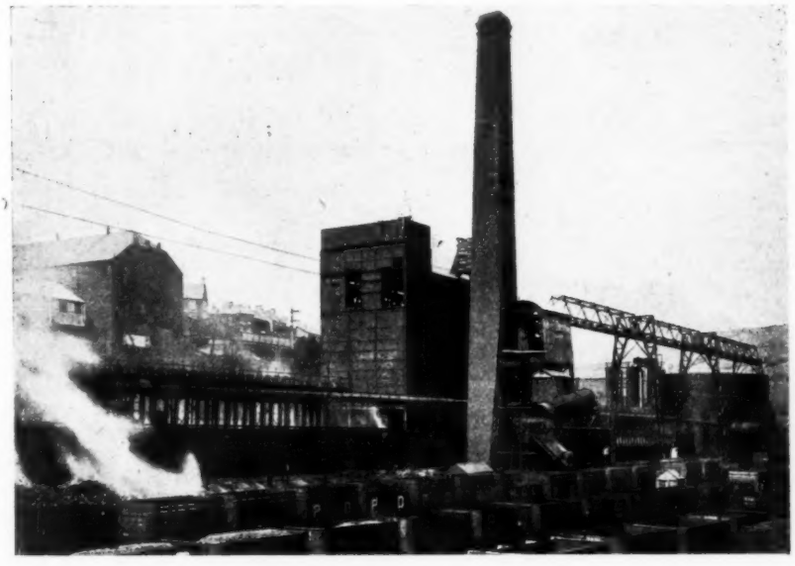


FIG. 18.—THE BARGOED COKE OVENS OF POWELL DUFFRYN.

Marley Hill Chemical Company, Limited.—This firm specialises in the manufacture of patent foundry coke suitable for all classes of foundry work, having studied the requirements of the trade for the best part of half a century, and numerous samples of their products are being shown. They employ a staff of chemists on research in metallurgical coke, and practical test demonstrations are carried out from time to time with their coke on local cupolas with a view to improving the efficiency of the article. The coking coals used are always from the same group of collieries owned by Messrs. Jno. Bowes & Partners, Limited, to ensure uniformity.

The works are situated at Marley Hill, near Newcastle, and they are thrown open to inspection by foundrymen during the run of the exhibition. The head office is at Milburn House, Newcastle-on-Tyne, whilst the London office is at 39, Lombard Street, E.C.3.

W. T. Hawkins & Company.—On this Stand will be found a series of proprietary materials used in foundry work. Amongst these are to

MR. W. C. HAWKINS (*Proprietor of W. T. Hawkins & Company*).

be found an iron cement, a high-pressure jointing cement, plastic fire cement and roofing plastic and bitumen paints.

The firm's works are at Chapel Hill, Huddersfield. The Stand is under the care of Mr. W. T. Hawkins and Mr. T. E. Robb.

F. W. Berk & Company, Limited.—This firm's exhibit consists of a 2-ton ladle which has been in continuous use on the Neutraline desulphurising process for an extended period. *Neutraline* is a new refractory material which has been specially designed for use in the desulphurisation of cupola metal with soda ash. Neutraline is prepared by a special process (patents pending) from the firm's own supplies of raw material, and is sold under a guarantee of performance, thereby ensuring that the cost of the desulphurising operation to the user shall not exceed a certain specified maximum. An exhibition Stand being an unsuitable location for demonstrations of the Neutraline desulphurising process at work, a well-known foundry has consented, for the benefit of all interested visitors, to open its doors. Application should be made at the Stand to either Mr. J. R. Booer, B.Sc., or Mr. J. P. Young.

The head office is at 106, Fenchurch Street, London, E.C.3, and the works are at Stratford-by-Bow and Morriston, near Swansea. American visitors can deal through the firm's New York house—F. W. Berk, Inc.

Beecroft & Partners, Limited.—This firm has two main activities. Primarily they are consulting metallurgists, possessing their own chemical-, physical- and mechanical-testing laboratories. Included amongst the machines in the last-named

MR. F. J. BEECROFT (*Director*).

MR. G. C. CASTLE (*Managing Director*).

department are a 50-ton Buckton, an Izod impact and a Hacksaw testing machine. The laboratory is regularly used by the Government departments, railway companies and other large buyers of inspected material. The second department has been a development of the former. It was felt that having research facilities at their

MR. C. WOOD (*Chief of Technical Staff*).

back they were in a unique position to manufacture reliable foundry specialities, with the result they are showing, for instance, Linol, Sandoil, Greenbond fluid, Greenbond solid, Corbeerite binder and Corbeerite powder. Various grades of parting powders and plumbagoes. Then there is a comprehensive exhibit of fluxes for iron, aluminium alloys and cuprous alloys, supplemented by a desulphurising compound for molten iron. As it is difficult adequately to show the facilities offered by the firm to the foundry industry, they decided to open their works and laboratories for inspection during the run of the Exhibition. These are situated in Sheffield, the factory being at Retort Works, Mappin Street, whilst the laboratories are in St. Peter's Close. The personnel attached to the Stand comprises Mr. G. C. Castle, Mr. F. J. Beecroft, Mr. W. B. Jenkinson and Mr. C. Wood.

Viozone, Limited.—A new type of pyrometer is being shown by this firm. It is an instrument of particular value in foundries, small workshops, for locksmiths, toolmakers, etc., on account of its extreme simplicity. It can be used effectively by ordinary workmen and it requires no adjustment or setting, there being no effect from atmospheric changes. Temperatures from 500 to 1,400 deg. C. can be observed. The instrument consists of a calibrated frame about 9 in. long, and a centre piece of glass, shaded from clear to opaque along the length covered by the calibrations. The frame also carries a square slide with a hole in the centre locating over the strip of shaded glass. For taking temperatures the hot body is sighted through the hole in the slide. The latter is then adjusted along the frame, and at the point where the glow of the heat disappears the slide is retained. The temperature is then indicated by the left-hand edge of the slide on the calibrated scale. Temperatures can be taken at the distance most convenient for the operator. The eyepiece shown is for use where the heat is too great for ordinary operation. According to the experience of users, different observers obtain practically the same reading, which is not always true with instruments for high-temperature measurement.

Mr. E. Siegrist (*Viozone, Limited*).

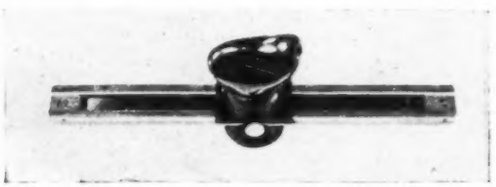
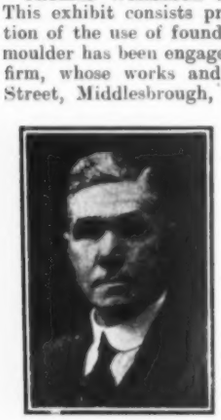


Fig. 19.—A New Pyrometer, by Viozone.

The head office is at 19, Cursitor Street, London, E.C.4. Mr. E. Siegrist is personally taking charge of the Stand.

Thomas Wilkinson & Company, Limited.—This exhibit consists primarily of a demonstration of the use of foundry blackings, and a local moulder has been engaged for this purpose. This firm, whose works and offices are at Stockton Street, Middlesbrough, engages in a large merchant business in addition to their activities as manufacturers of foundry facings and the like. For instance, they take shiploads of Erith loam for distribution in the North-East Coast. Again, they are distributing agents for Glutrin. Mr. Wilkinson personally will take charge of the exhibit.



Mr. Thomas Wilkinson (*Thomas Wilkinson & Company*).

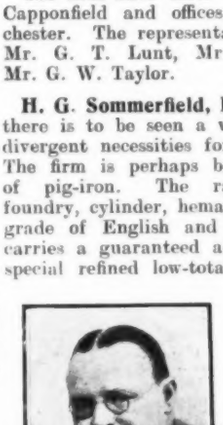
Bradley & Foster, Limited.—Everyone who is interested in high quality pig-irons for all purposes will be well advised to visit this Stand, as they are exhibiting a very fine selection of samples of refined pig-iron from their Darlaston Works and specimens of direct blast-furnace pig-iron from the Capponfield Works.

A great deal has been heard recently about refined iron, and this firm is one of the foremost makers, claiming that for high-duty castings which have to be made within fine limits of analysis to withstand definite tests, there is no reliable alternative. Numerous fractures of this refined iron are exhibited, covering a wide range of qualities, including cold-blast type and cylinder irons, iron suitable for malleable castings, and several qualities recommended for heat resistance, acid and wear resistance and chilled castings of all kinds. A large quantity of castings of various types made from these refined irons are exhibited, and various test-bars cast direct from the pigs.

The section of the Stand devoted to Bradley's Capponfield pig-iron displays samples, fractures and castings of cold-blast, semi-cold blast and hot-blast irons, all low in phosphorus and particularly suitable for classes of castings where strength and toughness are essential.

The firm have their works at Darlaston and Capponfield and offices in London and Manchester. The representatives on the Stand are Mr. G. T. Lunt, Mr. G. B. Richards and Mr. G. W. Taylor.

H. G. Sommerfield, Limited.—On this Stand there is to be seen a wide range of extremely divergent necessities for the foundry industry. The firm is perhaps best known as exporters of pig-iron. The range covered includes foundry, cylinder, hematite qualities in the best grade of English and Scotch, most of which carries a guaranteed analysis. Cold blast and special refined low-total carbon irons are also being shown, as well as pig-iron for steel and malleable iron manufacture. Samples of foundry coke are also on exhibit.



Mr. H. G. Sommerfield (*H. G. Sommerfield, Limited*).

The second class of material relates to industrial safety goggles, helmets and respirators. Here we suggest that there has never been made available to the foundry industry a more complete range of goggles. They cover the essential requirements of the furnaceman, the welder and the fettler. Cognisance is taken of defective eyesight, of comfort, of protection from injurious rays, dust, flying particles and of hygiene. Sand-blast helmets are shown in two models. Finally, there is an attractive range of asbestos clothing, the gaiter section of which should appeal to all foundrymen.

The head office of this Company is situated at Charterhouse Chambers, London, E.C.1. Mr. Sommerfield will personally take charge of the Stand.

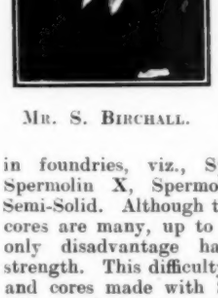
Spermolin, Limited.—As the application of oil sand for coremaking has now become general, instead of showing a multitude of cores this firm is exhibiting samples of intricate work such as cores for boiler sections, a six-cylinder motor-cylinder block and head, air-cooled motor-cylinder mould and cores, pump and impeller cores, also round, square, hexagon and oval cores, 4 ft. in length, made on the Spermolin patent rotary core machine. For these exhibits they are indebted to Messrs. Joseph Stubbs, Limited, Manchester; Messrs. Bean Cars, Limited, Tipton; and Messrs. Hartley & Sugden, Limited, Halifax.

The introduction of Spermolin in 1908 revolutionised core-making practice in the foundry world, the previous methods of making sand cores having been in vogue for over half-a-century. The Spermolin method has long since proved its value in efficiency and economy, and the demand is continually increasing.

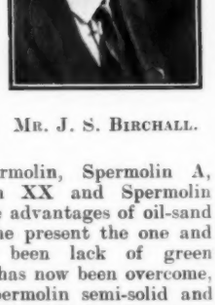
Mr. N. F. S. Winter.

Mr. G. A. Smart.

As the pioneers of the core-oil industry, the Company has kept well abreast of the times, and, as the result of continuous research, has been able to place on the market five different grades to meet the varying conditions prevailing in foundries, viz., Spermolin, Spermolin A, Spermolin X, Spermolin XX and Spermolin Semi-Solid. Although the advantages of oil-sand cores are many, up to the present the one and only disadvantage has been lack of green strength. This difficulty has now been overcome, and cores made with Spermolin semi-solid and silica sand, besides possessing all the advantages of oil-sand cores, has as much "green" strength as cores made from an ordinary clay-bonded sand.



Mr. S. Birchall.



Mr. J. S. Birchall.

The Spermolin Patent Rotary Core Machine.—This machine in its scope marks a definite progression in usefulness over other makes of machines constructed for the same purpose. There are improvements on all the characteristics of the normal machine, but in addition there is a special feature of a patent rising and falling tray carrier, which adjusts the tray to the exact level and parallel with the die, thus obviating the necessity of packing up the tray and eliminating bent and distorted cores. The raising and lowering action of the tray carrier is instantaneous, and there are no screws and

blocks to get clogged with sand. The hopper and tray carrier are mounted on a neat, strong cast-iron base, making the machine complete in one piece with perfect alignment throughout. It is of machine-tool finish, with all gears machine cut and adequately guarded. The dies and conveyors are ground, polished, tested and guaranteed accurate.

The Spermolin Patent Sand-mixing Machine.—This machine has been placed on the market

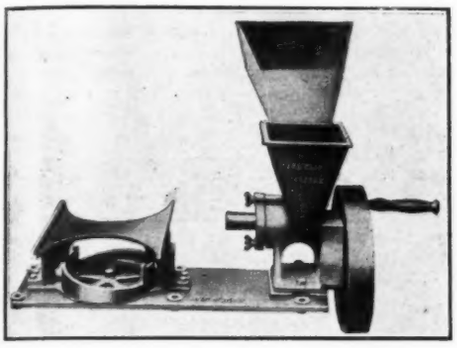


FIG. 20.—SPERMOLIN ROTARY CORE MACHINE.

to assist in the more practical and thorough mixing of oil sand. It is well known that it is almost an impossibility thoroughly to mix core oil and sand by hand. By so doing the mixture is anything but "even," and not only is more oil used than should be really necessary, but the core, when baked, is liable to certain hard and soft "spots." The "Spermolin" machine is entirely different from other mixing machines, the sand being rotated and conveyed to the centre by right- and left-handed scrolls, working on a common shaft. This causes an intensive rubbing together of the sand grains, which are thrown up in the centre, falling back towards each end of the machine, the action being continuous. In this manner the grains of sand are separated and given their quota of oil without being crushed into powder, as is the case with some mixers. The action is so rapid that a batch of sand and oil can be thoroughly mixed in three minutes.

The discharging arrangement is simple, no tilting being necessary. It consists of an oblong damper in the centre of the pan bottom, which is operated from one end of the machine, the sand being discharged automatically into a conveyor or barrow.

The head office of this concern is situated at Black Swan Works, Halifax. Messrs. Norman F. S. Winter, G. A. Smart, S. Birchall and T. S. Birchall form the personnel attached to the Stand.

T. Fearnley Allen & Son.—This Stand is entirely devoted to sand-blast apparatus, which is being shown in operation. This will enable

MR. ALFRED GUTTMANN (*T. Fearnley Allen & Son*).

founders better to appraise the "dustless" features attributed to this type of plant. *Inter alia*, the pressure apparatus "Alpha B" has been chosen for exhibition.

"*Alpha*" *and* "*Hoalpha.*"—This apparatus is shown to be of sturdy construction, large capacity and simple in operation. Its special feature is the reliable construction of the main sand valves. These valves are subject to severe working conditions, more especially with high pressure of 60 lbs. per sq. in., and in this design the rubber packing lies outside the stream of sand, thus ensuring a reliable seal when the valve is closed. This prevents undue wear on the valve parts. A patent cleaning-out pipe is fitted which facilitates the removal of stoppages from the sand passage.

The "Alpha" apparatus is designed for working pressures up to 30 lbs. per sq. in., and the "Hoalpha" for pressures up to 60 lbs. per sq. in., but they make special apparatus for still higher pressures if desired.

To this apparatus a chamber is attached. It is normally for cleaning small tools, such as

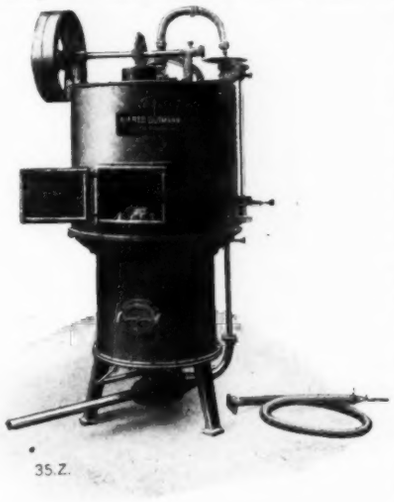


FIG. 22.—GUTTMANN SAND-BLAST CABINET.

drills, reamers, milling cutters, taps, etc., also for cleaning carbonised machine and motor-car parts, such as gears, shafts, spindles, etc. It is also used for cleaning small quantities of small ornamental castings. The chamber is fitted with inspection window, arm holes, etc., is built in two standard sizes of 24 and 30 in. dia.

A special mention should be made of a dwarf revolving barrel which is being shown. Rhomboid-shaped castings are fitted to the barrel ends thus causing the work to pass evenly to and fro under the blast from the nozzles. Fixed nozzles are used so as to eliminate all moving parts which are subject to heavy wear. The machine is fitted with an elevator for the automatic return of the used abrasive to the pressure apparatus. A dust separator is built into the elevator, so that only clean abrasive, not mixed with dust, is used again—this fact naturally

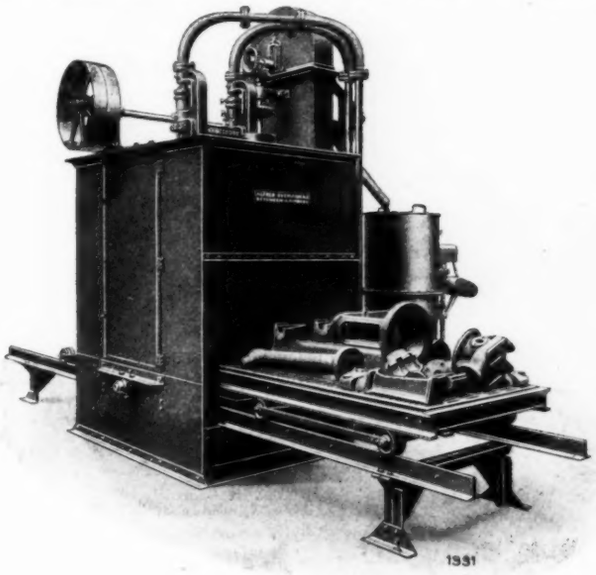


FIG. 21.—GUTTMANN PUSH-THROUGH SAND BLAST.

makes for efficiency, both in abrasive rate and the prevention of undue dust development. The machines are totally enclosed and the gears are guarded.

The use of the direct-pressure system is retained in the dwarf machines—as this system fully utilises the compressed air. The main feature of this machine is compactness; the barrel and casing is mounted directly above the pressure chamber.

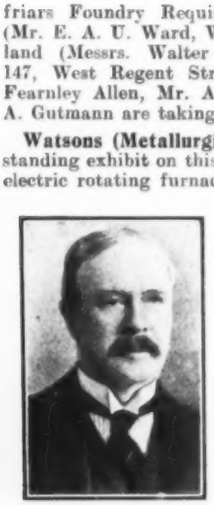
A rotary-table machine always attracts attention in an exhibition, and that shown on this Stand will be no exception. It has a self-contained sand-blast apparatus and automatic sand feed, whilst it is also fitted with a double row of rubber curtains. One of the principal features of this type of machine is the large output obtainable, reaching up to as high as 45 cwts. per hour, according to the class of work undertaken. The machine is provided with a standard bucket elevator and sand separator, and is stated to work free from dust. The drive of the table is at its periphery through a toothed ring, and is fully protected from the action of the sand blast.

"*Perfecta*" *Sand-blast Cabinet.*—This cabinet has been specially designed for sand blasting small- and medium-sized castings, and is particularly suitable when using high pressure, *i.e.*, 60 lbs. per sq. in., as no dust is emitted at the front. The work is placed on the cast-iron grids, the operator stands outside the cabinet and directs the free-blast nozzle through the rubber curtains. Good vision of the work is obtained through the thin wire sight screen, and the inside is illuminated by electric light—the latter is protected by a properly-designed guard. The dust is drawn off by an exhaust fan. The cabinet is generally fitted with worm and elevator for the return of the used sand, but if desired the pressure apparatus may be placed below the cabinet so that the used sand falls back to the apparatus.

The head office of the firm is situated at 51, Norwich Union Chambers, Birmingham. The works are at Ollensen-Hamburg, Germany. Sub-agents have been appointed in London (Black-

friars Foundry Requisite Company), Sheffield (Mr. E. A. U. Ward, White Building) and Scotland (Messrs. Walter Chambers & Company, 147, West Regent Street, Glasgow). Mr. T. Fearnley Allen, Mr. Andrew E. Allen and Mr. A. Gutmann are taking charge of the Stand.

Watsons (Metallurgists), Limited.—The outstanding exhibit on this Stand is the "Watson" electric rotating furnace. This is of interest to all manufacturers of non-ferrous alloys, who are concerned in securing improved methods of manufacture, more especially when associated with the reduction of production costs. The "Watson" electric rotating furnace has been specially designed for the manufacture of brass and other copper alloys and represents the latest advance in furnace production, being the result of many years' research on the subject of electric melting of metals.



Mr. T. H. Watson (*Chairman—Watsons (Metallurgists), Limited*).

Description.—The "Watson" furnace consists of a stout steel barrel lined with suitable refractory materials and supported on rollers, which are geared to a small motor. For rotation purposes the final drive from the rollers is frictional, the weight of the shell and its contents ensuring steady movement. Suitable switchgear is provided to enable rotation to be carried on in either direction, giving full control of the spout for pouring purposes.

The heat for melting is obtained by means of an electric arc formed between two or more electrodes, which is magnetically blown into a large flame, thus giving an even distribution of heat to all parts of the interior of the furnace. The furnace interior is shaped to secure maximum heating efficiency from the arc, and is nearly spherical in outline. As soon as a good bath of metal is formed, the furnace is rotated slowly, the metal taking up any excess heat from the lining. A pouring temperature is quickly obtained, and a thorough mixing of the bath takes place. The tap hole is then opened and the furnace rotated to bring the spout below the level of the bath. The contents can be poured direct into moulds by means of a stopper and nozzle fitted to the tapping spout or into pre-heated ladles and taken away. By switch control of the motor the furnace can be emptied intermittently at will.

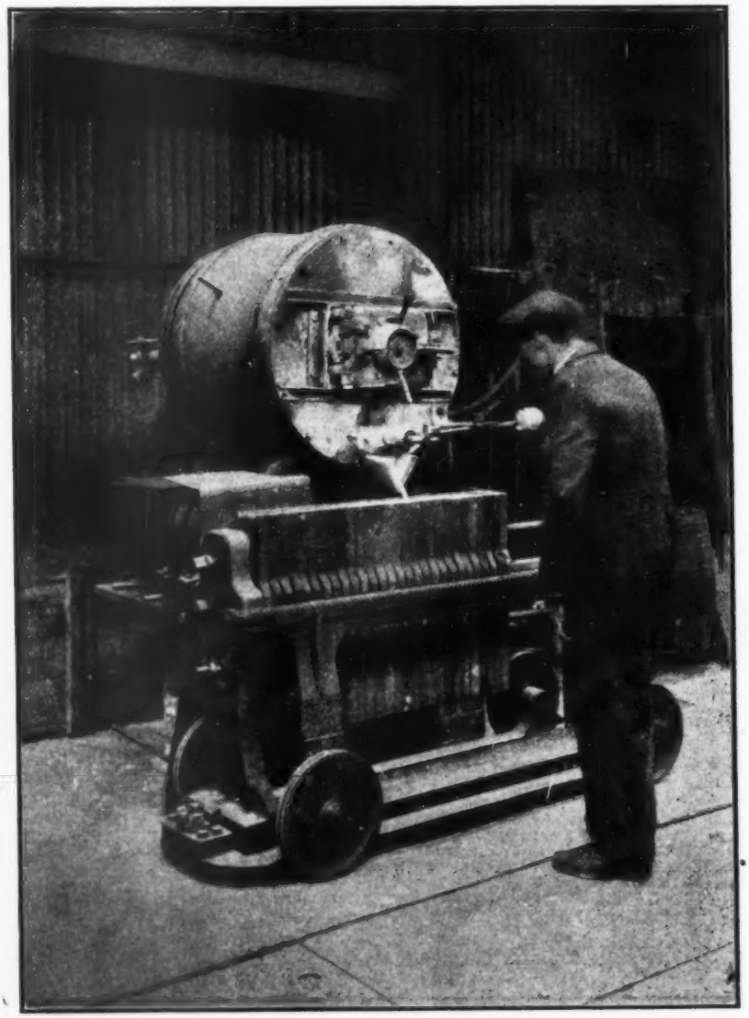


Fig. 23.—The Watson Electric Furnace.

The rotation of the furnace is a most important feature, it prevents the destruction of the lining, the metal continually washing almost the whole of the interior; the efficiency of the furnace is enormously improved, since no part of the furnace is heated to a higher temperature than the metal, also the metal itself is thoroughly mixed and a perfectly homogeneous product obtained.

While very high temperatures can be obtained in this furnace (over 1,500 deg. C.), the melting of copper and copper alloys does not require anything like this figure, and the lining for such work is stated to last 1,000 heats.

Photographs and diagrams of the Greaves-Etchell's furnace emphasise in no uncertain manner the position that furnace has attained in the metallurgy of steel. A complete range of alloys for the metallurgical industry completes the exhibit.

Mr. T. H. Watson, Mr. H. A. Greaves and Mr. C. Levesley comprise the personnel attached to the Stand. The Company's head office is in Lancaster Street, Sheffield; the works are near by, in Platt Street; the London office is located at 8, Southampton Row.

Anglo-Belgian Refractories.—Belgian sand has won for itself a strong position in British steel foundries, and this Stand shows the sands offered and green-sand castings made from its use. No sand is universal in its use for foundry practice, and a British core sand—Leighton Buzzard—is also being shown. The only machine on exhibit is one entirely new to the industry, and is completely distinct from any other core machine on the market. As this was described in our columns only a fortnight ago, we must refer readers to that issue.

The head office is situated at 14, rue Longue Ransart (lez-Charleroi), Belgium, whilst the British branch is located at Beaumont, Solihull Lane, Hall Green, Birmingham. On the Stand are Mr. Donald Pitt and Mr. Hergot (from Belgium), and Mr. Ralph Wilson, the patentee of the core machine.

Grant & West, Limited.—This well-known firm of engineering-supply manufacturers are exhibiting seven of their best-known specialties, namely, "Belfo" belt food and treatment, "Selek" metal-to-metal jointing material, "Plastiloy" plastic metallic packing, "Ropres" steel wire-rope dressing, "Revomer" rust solvent, "Flinso" tinning compound and "Flinso" aluminium solder.

"*Belfo*" is a British-made belt food, and has been specially designed by the manufacturers for the treatment of all forms of belting, including leather, hair, balata, cotton, composition, link, etc.

"*Ropres*" is a new product of this Company, and has been specially designed for the treatment of steel-wire ropes, used for haulage and kindred conditions. The effect of "Ropres" is to penetrate right into the heart of the rope, lubricating each individual strand, and rendering the rope water-proof, acid-proof and damp-proof.

"*Selek*" is a jointing material in powder form, which in practice forms a non-oxidising, non-rusting joint, designed to withstand any temperature or pressure of steam, super-heat, water, gas, brine, alcohol, petrol, oil, spirits, chemicals, etc.

"*Plastiloy*" is a plastic metallic packing, having the unique advantage that it is a one-size packing for all sizes of rods and glands. It is plastic, anti-frictional, self-lubricating, and the anti-frictional metal in its composition has a high melting point.

"*Revomer*" rust solvent is a composition for removing rust, and is designed to shift the most obstinate rusted-up bolt within five minutes.

"*Flinso*" tinning compound cleans and tins all metals except aluminium, without previous cleaning or preparation.

"*Flinso*" aluminium solder embodies a new process for soldering aluminium and its alloys at low temperature, *i.e.*, 160 deg. Fah., for sheet

work and 250 deg. Fah. for cast. The "Flinso" process is non-oxidising and non-corrosive, is electrically and mechanically sound, and makes a repair as strong as the original.

The head office is situated at 17, South Street, London, E.C.2, whilst the works are at 25, Richmond Street, London, E.C.1.

The personnel attached to the Stand comprises Mr. James H. Cooke, director; Mr. W. F. Underwood and Mr. W. D. Coldwell.

General Refractories, Limited.—At this unique Stand may be seen a large variety of materials, tastefully arranged, which are marketed by this progressive firm, which caters for all kinds of furnace building, lining and repairing refractories for steel, iron and non-ferrous foundries may been seen in abundance. To mention but a few of the specialities of this well-known firm there are the following:—

Sheffield Ground Ganister for cupolas, converters and crucible furnaces.

Upper (Left): MR. A. C. TURNER (London Representative); *Upper (Right)*: MR. T. SINGLETON (Director); *Lower (Left)*: MR. C. PRESSWOOD, B.Sc. (Technical Dept.); *Lower (Right)*: MR. G. SENIOR (Director).

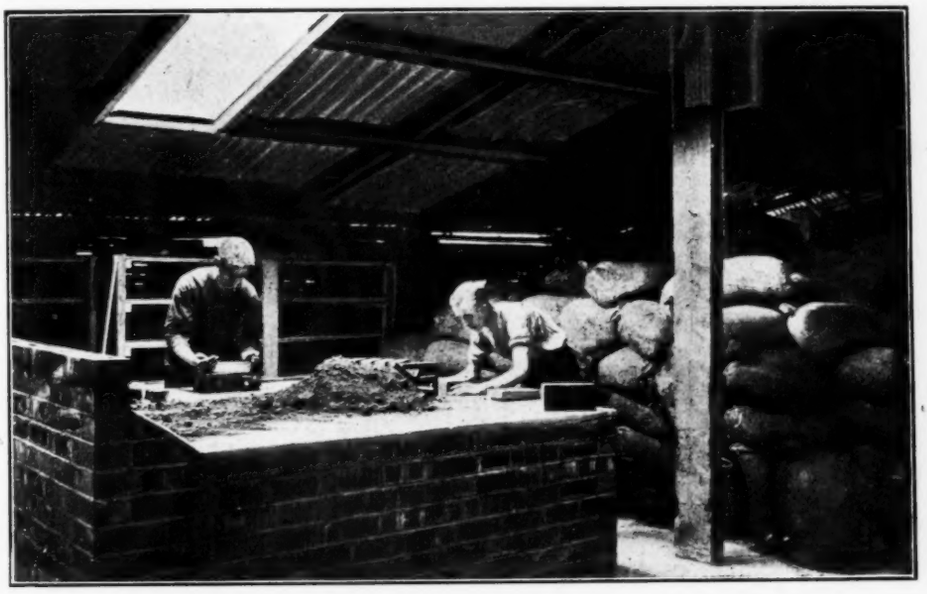


FIG. 24.—HAND-MAKING SPECIAL BRICKS AT THE WORKSOP WORKS—GENERAL REFRACTORIES, LIMITED.

Sheffield Steel Moulders' Composition for heavy steel casting.

"*Yorkshire Sand*" for all classes of steel castings, manufactured and specially prepared for the individual needs of each client.

Iron and Non-ferrous Foundry Sands.—This firm has extensive resources of all kinds of sands and actually control quarries and mines all over the country producing these classes of sands.

Another speciality is "*Pyrolyte*," a unique cold setting refractory cement; *Magnesia bricks; slag-resisting coroma bricks* and *silica bricks* for the acid and basic steelmaking processes, and all the needs and requirements of refractories for the foundry and allied industries.

Cupola and foundry refractories naturally predominate in this Exhibition, and samples of moulding sands, core sands, core binders, mixing sands, parting sands, and moulders' paints, and also "*Insulite*" *bricks* and *cement*, for heat-insulating purposes, of which practice this firm may be called pioneers.

The firm's head office is at Wicker Arches, Sheffield; the London office at 92, Cannon Street, E.C.4; and the Glasgow office at 82, Dale Street, C.5. Resident representatives are located in Birmingham, Leeds, Teeside, Swansea and Tyneside, whilst the companies' works and quarries are spread over England and Scotland.

The duty of taking care of the Stand has been delegated to Mr. Geo. Senior, Mr. T. Singleton, Mr. A. C. Turner and Mr. C. Presswood, B.Sc.

FIG. 25.—THE BRAMCOTE QUARRY OF THE GENERAL REFRACTORIES.

Coleman Foundry Equipment Company, Limited.—This is one of the most imposing Stands in the Exhibition, and a series of interesting machines have been collected together, of British, American and German origin, in order that there should be provided a machine definitely suited for each job. The variety of work turned out by the industry demands such a range. The following gives an indication of the range covered:—

MR. C. W. COLEMAN (*Managing Director*).

DR. BRANDENSTEIN (*German Representative*).

MISS C. MORRIS (*Director and Secretary*).

Power Plant.—Air receiver and electric motor, supplying air for six moulding machines.

Moulding Machines.—A "Coleman" small plain jar-ram moulding machine; a "Coleman" jar-squeezer moulding machine for snap-flask work or double-sided work to be used with a snap flash; a "Coleman" plain split-pattern squeezer machine; a "Coleman" jar-ram open-end power-squeeze moulding machine. This machine jars any load that one would wish to put on a small machine—to be exact, it has a lifting capacity of 6,000 lbs. A "Milwaukee" jar-ram stripping-plate machine of the open-end variety; a No. 22 "Davenport" jar-ram roll-

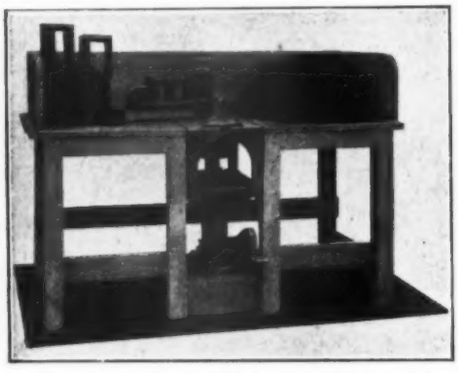


Fig. 26.—Coleman Runner Bush Machine.

over draw moulding machine; and a runner bush and riser-cup machine. This machine is shown making both oblong and round bushes. Round bushes are made at the rate of ten per minute and oblong bushes at the rate of six per minute.

Sand Machinery.—In this group there is a sand hopper feeding two moulding machines, into which a "Coleman" Prosama sand-throwing machine delivers sand. Then there is a "Prosama" sand-mixing machine—mixing, disintegrating and revivifying the sand. A second machine of this type is shown stripped for examination by visitors. Also being shown is a vibratory sand-sifting and mixing machine, and a core-making machine ("Rolff" system), for both round and square cores. Those of a more academic turn of mind will be interested in a set of sand-testing machines for the laboratory.

The sundries shown on this Stand are of more interest than usual. For instance, there is a new type of wax fillet; a really "cute" set of core-box pins for clamping core boxes, and a novel type of patternmakers' vice. Other specialties are a double-end grinding machine, ply wood, dowel pins, vibrators and pneumatic tools.

The head office of the Coleman Company is located at 1, Lancaster Place, Waterloo Bridge, London, W.C.2. The personnel attached to the Stand comprises Mr. C. W. Coleman (managing director), Miss C. Morris (director) and Dr. Brandenstein (the German representative).

J. W. Jackman & Company, Limited.—Foundrymen have long recognised an inherent defect and disadvantage in the ordinary sand mills, namely, that the rolls are too heavy, with the result that the sand is excessively crushed and generally deteriorated. The sand mill shown on this Stand is a well-designed machine, incorporating the following features:—The roll is of special conical shape to suit the slope of the pan, and is made with chilled-wearing surface. The conical shape provides a rolling and grinding action over a large area, and the whole of the sand passes under the roll at each complete revolution of the pan. The pressure on the roll can be varied by means of an adjustable-spring attachment. The pan is dish-shaped, with sloping side, and rotated by gearing underneath. Four scrapers are fitted to the pan, of which two are fixed. They serve to move the sand on to the slope of the pan and to turn it over in a plough-like manner. The third and fourth scrapers, when lowered, effect the complete and regular discharge of the sand, over the side of the pan, *at one definite point*. The third scraper is used when mixing only, and no grinding is required, and when the mill is discharging sand.

The Vulcan Sand-disintegrator and Thrower, which is being shown for the first time, is motor-driven and portable. It possesses three features, that it is a sand disintegrator, a sand sifter and a sand thrower. The rough untreated sand is fed into the hopper, which is fitted with a grid in the top, and falls by gravity on to a rotating plate carrying specially-shaped beaters. As a consequence, the sand is subjected to a centrifugal action, becomes thoroughly aerated and disintegrated and is shot out through the discharge shute. Here it has to pass first a suspended steel rake or comb and then a sieve. The rake or comb arrests metal such as sprigs, nails, etc., and foreign matter, while the sieve provides a final separation and ensures a complete breaking up of the sand. The sand is then discharged in an upward or horizontal direction, depending upon the setting of the machine and the discharge shute, the angle of which can be varied.

The question of the recovery of iron or steel and coke from moulding sand is illustrated by an exhibit of a revolving-screen type separator. This machine solves the problem of cleansing used moulding sand in the foundry, and recovering therefrom the iron or steel and coke. The machine is portable and mounted on four wheels. In operation, the material passes from the hopper, shown at the left end of the machine, along a shute into the revolving screen. The sand is thus sieved and falls through the screen under the machine. The metal, coke and

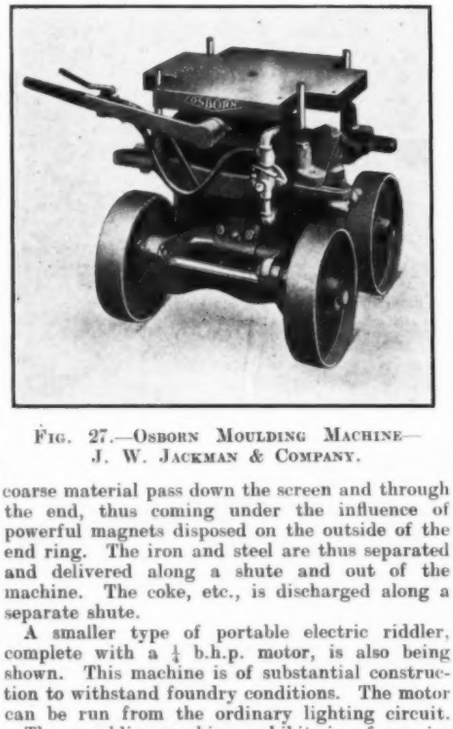


Fig. 27.—Osborn Moulding Machine—J. W. Jackman & Company.

coarse material pass down the screen and through the end, thus coming under the influence of powerful magnets disposed on the outside of the end ring. The iron and steel are thus separated and delivered along a shute and out of the machine. The coke, etc., is discharged along a separate shute.

A smaller type of portable electric riddler, complete with a ¼ b.h.p. motor, is also being shown. This machine is of substantial construction to withstand foundry conditions. The motor can be run from the ordinary lighting circuit.

The moulding-machine exhibit is of an interesting character. Primarily, there is the well-known *Osborn-type Roll-over Jolter*. This machine is equally suitable for jobbing or repetition work. The machine effects the ramming of the sand, by jolting, and the upward withdrawal of the pattern from the mould, the latter remaining on the mould carriage. The table of the machine admits of the use of existing pattern plates, either single- or double-sided. One single valve controls the operations of jolting and pattern draw. The roll-over table is made of aluminium alloy, and, designed with a shallow offset, rolls over on the approximate centre of gravity with very little effort. Two quick-acting clamps ensure a speedy means of securing the box during rolling over, and are adjustable lengthwise, so that varying sizes of boxes, up to the maximum capacity of the machines, can be used.

When the box is filled with sand, a stream of air is directed on to the jolt table by depressing a separate valve, thus cleaning the face of

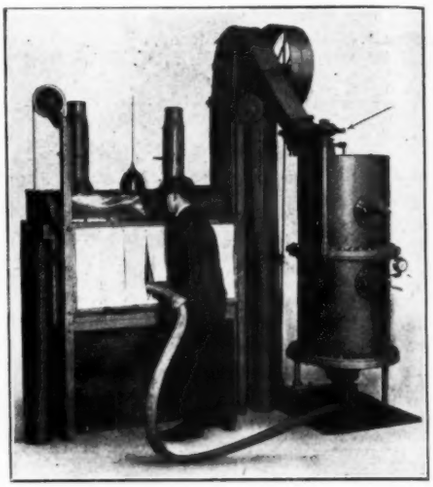


Fig. 28.—Sand Blast Machine—J. W. Jackman & Company.

the jolt table. Immediately upon moving the handle of the control valve to the "Jolt" position, the jolt table rises, comes into slow contact with the roll-over table and the sand is jolted. The handle of the control valve is moved to the "neutral" position and the rammed mould clamped up, using a bottom board. The table is then rolled over and the levelling carriage swung in. This carriage is provided with depressable pins, all locked by one handle. As the operator swings the carriage under the mould, the levelling-pins are depressed by movement of the handle towards the left, thus allowing them to clear the underside of the bottom board. Finally, contact between the levelling pins and the bottom board is effected, and the pins locked by turning the handle to the right.

The clamps are instantly released and the pattern drawn upwards from the rammed mould. This draw takes place in two stages, first a slow steady movement, during which the vibrator is

Fig. 29.—Vulcan Sand Thrower—J. W. Jackman & Company.

automatically put into operation, and second a fast draw, during which the upward stroke is completed rapidly, the vibrator being automatically turned off. The finished mould is then swung from the machine on the carriage and the roll-over table rolled back ready for the next mould to be made. The machine is self-contained, and is complete with clamps, vibrator, oilers and all valve piping.

Osborn-type Press Roll-over Jolter.—With this machine the moulds are pressed after jolting and flat ramming is completely eliminated. Striking off the sand prior to pressing is done by a simple adjustable striking bar, supported by two arms connected to the main frame of the machine. This ensures a definite amount of sand being used for each mould. After pressing the mould, the box clamps are automatically released.

On the *Osborn-type Jolt-press Moulding Machine* moulds are jolted and pressed, control being effected through separate valves, and flat ramming is thus eliminated. The top and bottom halves can be pressed together, or each half rammed up separately. The machine arranged with balanced presser head, readily adjustable for different depths of boxes. The ends of the table of the machine are open, and when the presser head is swung back, the table is clear. There is a uniform pressure on all moulds, irrespective of fluctuations in air pressure, due to a special pressure-release valve, graduated for various pressures.

The last machine of the Osborn type shown is a jolt-strip moulding machine. This is a portable machine, with heavy plain table to take various sizes of plates. Four lifting pins are arranged to give a wide range of positions and direct engagement with the moulding box or to the stripping place. The box lift is through single lever.

Two hand-operated moulding machines are on the Stand. In one type the moulds are raised from the pattern plate by means of four lifting studs, operated through a single lever at the front of the machine. The positions of the pins can be varied to suit various sizes of moulding boxes. The second machine is made with adjustable sides, so that boxes of different widths may be accommodated. The ends of the machines are open, thus permitting the use of patterns several inches longer than the machine. The pattern plate is carried on the inner frame and the moulding box on the outer frame. Guides on both sides of the machine, and on the base, ensure a true vertical draw.

Amongst core-shop equipment there should be noted the well-known Wadsworth-type geared core machine. This machine is built to make round cores, and is fitted with a combination pulley, by which it can be operated by power for all sizes up to 7 in., by hand power for making cores up to and including 2¼ in. dia., or by hand power when a 36-in. hand wheel is substituted for the pulley, for all sizes up to 7 in. Then there is the Mumford-type core jolter, for which no clamping of core box required on to table of machine. The final exhibit for the core department is a sand kneader and mixer. The mixed sand can be instantly discharged by tilting the trough, the two vertical handles enabling this to be done quite readily whilst the blades are revolving.

The fettling department is catered for by a series of sand-blast machines. Primarily, there is a general-purpose cabinet arranged with pressure appliance underneath. The stopping and starting of the blasting is effected through a single lever. The used abrasive falls by gravity back to the pressure appliance for use again. The operator stands outside, with his arms through sleeve armlets in the door (he wears gloves), and the work is inspected through the gauze- and glass-covered opening. The door is easily fastened.

Then there is a large rectangular cabinet. By means of the counterbalanced door, which extends the full length of cabinet, castings can be quickly placed inside and taken out. This door is arranged with a double-rubber panel and through slits in it the operator can project the nozzle; moreover, there is an observation window running the full length of cabinet, at a height convenient for the operator.

The final exhibit in this section is a sand-blast cleaning barrel. In its design two very important considerations have been kept to the forefront:—(1) Elimination of wear on the barrel treads and rollers and (2) a pressure apparatus in which the abrasive is stored, fitted with a valve that can be readily adjusted and that can be easily opened for inspection. The barrel consists of a double casing made of suitable steel plate. The outer casing is conical whilst the inner casing is cylindrical and perforated, thus allowing the abrasive material to fall into the annular space between the two casings, and thence through the totally-enclosed trunnion to the cleaning box at one end of the barrel. This arrangement ensures that no dust or abrasive material can reach the rollers. The barrel-end plates are of cast iron, with wide treads. The barrel is carried on four rollers, keyed to gear-driven shafts, the gears being completely enclosed. The drive is by belt to fast-and-loose pulleys. An air-tight door, readily removable, is fitted to the barrel. Two substantial "A" frames carry the barrel, the whole being mounted on a cast-iron base plate.

Abrasive material and dust pass through a hollow trunnion to the cleaning box. In this box the abrasive material is screened, the dust being separated and carried away to the dust separator, whilst the cleaned material, ready for re-use, passes to the pressure apparatus. The tailings, consisting of nails, sprigs, coarse material, etc., are retained on a screen which can be readily cleaned. This is of simple construction, consisting of an upper chamber into which the abrasive material is continuously fed from the barrel, and a lower chamber, under pressure, and from which the abrasive material passes through a control valve and into the delivery pipe connecting the pressure unit and the barrel. A valve, located directly below the lower pressure chamber, is used for regulating the flow of abrasive material to suit requirements. This valve is readily accessible and can be taken apart for inspection by releasing a simple clamp. The pressure apparatus is connected to the nozzle in the barrel by steel piping, special reinforced hard-iron bends being used which will withstand severe wear and abrasive action. A nozzle is fitted into the end plate at one side of the barrel, and can be rapidly removed. The movement of a single lever opens and closes a valve which starts or stops the blasting process. Immediately this valve is opened the abrasive material passes along the delivery pipe connecting the pressure apparatus and the barrel, and is discharged through a nozzle into the barrel.

Of interest to the non-ferrous foundry owner is a belt-driven git cutter, in which the bottom cutter remains fixed, but is adjustable in height to allow for wear.

Last, but not least, there is being shown a drum-type magnetic separator. It is fitted with a large cast-iron hopper, having an adjustable slide plate to control the rate of feed of materials to the drum. The material falls on to a power-operated shaking tray, which effects a uniform distribution over the drum, which is fitted with powerful magnets. The control of the current to the magnets is through an ironclad switch having non-inductive resistance to take the shunt discharge spark. The rotation of the drum is effected through a belt pulley, which also operates the shaking tray.

The firm have extensive manufacturing facilities at Vulcan Works, Blackfriars Road, Manchester, whilst their London office is in Abbey House, Westminster, S.W.1. The personnel attached to the Stand is composed of Mr. W. Rawlinson, Mr. S. E. Garratt (directors), Mr. J. W. Neville, B.Sc. (chief designer), Mr. M. W. Zeman (special representative for moulding machines), Mr. H. E. Warner, Mr. W. H. Littleton, Mr. L. W. Rigby and Mr. G. Mercer (representatives).

The Rapid Magnetting Machine Company, Limited.—On this occasion this firm are exhibiting several new types of special electro-magnetic equipments for use in foundries, metal and other trades. Primarily, they are giving a practical demonstration of *Lifting Magnets*, which are definitely labour-saving devices for charging furnaces. These can be used in conjunction with hoists, cranes and the like, and are also suitable for unloading railway wagons.

Foundry Sand-screening Plant.—Of special interest to foundries are the foundry sand-screening and separating plants, of which two types are being shown, one suitable for dealing with 3 to 4 tons of sand per hour, and the other 1 to 2 tons per hour. The 3- to 4-ton per hour embodies a high-intensity "AA" drum separator and a jig-shaken tray with sieving arrangement, and is the outcome of much experimental work. The high-intensity "AA" separator is specially adapted for foundry work, and has a marked advantage over the pulley type in view of its large diameter and high-intensive interior, which has special stationary magnets, about which revolves the drum. The sand, after being shovelled into the boot of the elevator, is carried up and deposited into a jig-shaken tray, where it is sieved and from thence it passes over the face of the high-intensity "AA" drum, where the iron is carried round to the back-bottom position. The sand falls in the front by gravity. The whole plant is self-contained, with motor drives and necessary switch gear. The 1- to 2-ton per hour embodies a pulley type

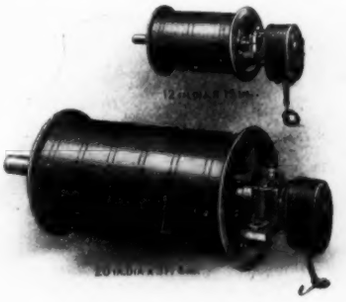


FIG. 30.—MAGNETIC SEPARATOR—RAPID MAGNETTING COMPANY.

and a jig-shaken tray with sieving arrangement, and is specially designed for use by the small foundry owner, where the output and price of the larger machine is not practicable. The plant is built on the same robust lines as the larger plant. The sand is carried from the receiving hopper by means of a band conveyor over the face of the pulley-type separator, where the iron is deposited in the back-bottom position, the sand falls by gravity down a shute on to a jig-shaken tray, where it is sieved.

Combined High-intensity Standard and Shute Separator.—An interesting type of separator for separating iron and brass swarf is the combined high-intensity standard and shute separator. This machine removes iron from metal turnings, dust and small non-magnetic substances, and is particularly suitable for treating such as contain a large percentage of iron. The material to be separated is fed into a hopper, which can be adjusted to deliver from a few pounds to several hundredweights per hour, according to the requirements of the material. A feed tray underneath is jig shaken and distributes the material in a regular and constant stream on to the whole width of the revolving brass drum, inside which, radiating from the centre, are specially-designed electro-magnets. These magnets are so constructed that a magnetic field is placed across the face of the drum. The magnetic element due to the magnetic influences is made to gambol from one position to the other, thus freeing itself from non-magnetic element. After the material to be separated is passed over the face of the drum, it then passes over a five-bar high-intensity shute-type separator, which is also jig shaken,

thus ensuring that the material is separated to practically 100 per cent. From this it will be seen that a clean separation is possible.

The electro-magnetic units in the first case are stationary, the non-magnetic cylinder is made to revolve in suitable bearings and this latter totally encloses the coils and protects them from mechanical injury. The electro-magnetic unit in the second case consists of a number of high-intensive coils and cores arranged to feed bars so placed across the width of the shute to attract any stray pieces of iron.

20-in. dia. Magnetic Clutch.—This exhibit is of the totally-enclosed pattern, and is coming to the fore with regard to line-shaft drive for power transmission, and also finding favour for machine-tool drives, such as planers and the like, and also steam winches and haulage gear. The three pulleys on the Stand are exhibited in order to show the range of separators of the drum-pattern manufacture, the various types having their particular application. The motor blower is suitable for work in the foundry in conjunction with furnaces, etc., and blowing unwanted sand from large moulds, etc.

The head office of this Company is at Magnet Works, Lombard Street, Birmingham. The following gentlemen are in attendance at the Stand:—Mr. W. E. Box (technical adviser), Mr. J. T. Claridge (designer) and Mr. W. Ward.

It is interesting to note that at the works in Birmingham there exists a showroom where samples can be tested free of all obligations.

W. T. Nicholson & Clipper Company, Limited.—*The Improved "Klincha" Belt-lacing Machine* is shown to embody several improvements. Its principal feature is as follows:—Detachable magazine facilitating the insertion of the hooks into the machine when making the joint, and improvements enabling the machine to be operated with one hand, leaving the other free to hold the belt in the correct position while the joint is being made. "Klincha" belt fasteners are now mounted on an outside paper strip and made up in 12-in. lengths, preventing any lateral displacements and making it easier and quicker to place the fasteners in the machine. The fasteners can be cut to any length required without disturbing the hooks, which are held in correct position and spacing independent to the slots of the machine, and thus no time is wasted in straightening out displaced hooks, as occurs with other carded types. Joints made with the "Klincha" system are flexible, detachable, interchangeable, smooth running and will run round the smallest pulleys without knock or jump. No skill is necessary or stoppage of machinery involved. No wastage of time and material, and no projections, consequently, no danger to workmen.

The "Python" File and Tool Handle has a steel-coil spring pressed into the centre, which is secured in its place by a specially-designed ferrule. These two together take up all the pressure when the file is driven into the handle. The ferrule cannot be removed without destroying the handle. The handle grips the file tang much firmer than the ordinary handle, because the wood is compressed within the coil spring when the file is driven in.

The head office is at Clipper Works, King Street, Salford, Manchester.

Britannia Foundry Company, Limited.—On this Stand there is a particularly interesting range of moulding machines, mainly of the jar-ram variety. One of the most popular of these machines is represented by a No. 1 Britannia. It is a self-contained apparatus, which incorporates an annular piston-guided inside and out on the whole of its area, thus giving a large bearing surface, indicative of a truly accurate lift. It takes moulds up to 10 cwts.

Next there is the Coventry turnover jar-ram machine. This popular machine, it will be recalled, lowers the mould from the turnover table by a central piston, working inside the jarring piston. The pattern-drawing piston is operated through pneumatic pressure, thus insuring a perfectly true draw. The type shown allows of the

Mr. D. G. Lennox (*Britannia Foundry*).

withdrawal of the mould by means of a ball-bearing trolley mounted on rails.

A third type of moulding machine exhibited is the "Coventry" pneumatic jolt-squeeze machine. The jolting, squeezing and lifting operations are worked by compressed air, the valve for the jolting being operated by the knee. The stripping cylinders are controlled by a single lever, which also actuates the vibrator. A pressure gauge is attached to enable the operator to impose the exact pressure required for each type of mould.

For intricate moulds and those demanding a serious lift for stripping, the "Coventry" head-rammed moulding machine is being shown. No power is used, but by a mechanically-geared head enables a man to ram a mould as hard as is demanded by any type. Like most of the moulding machines made by this concern, steel has been incorporated for any part liable to fracture when made in cast iron.

For light work, a machine carrying the trade-name of "Adjustable" is being shown. It consists of a pedestal, on which are mounted four radially-movable arms. Upon these arms are sliding tools which carry the moulding boxes. They can be quickly moved to take any size box from 10 in. to 30 in. wide, the length being unlimited, and locked in any position by ordinary nuts. The pattern plates can be fixed on to resistance boxes, sliding arms, or directly on to the table, in the centre of which is a strong plunger, which supports the plate in a suitable manner and takes all the pressure of the ramming. The plunger is operated from below with a crank and central thrust connecting rod, which enables the pattern to be drawn from the mould in a perfectly true, smooth manner. All the working parts are machined and, being enclosed, are entirely protected from any evil effects of the foundry sand.

The "Coventry" pneumatic sand sifter, which is well known and appreciated, and the "Coventry" oil-sand mixing machine complete the exhibit. This last plant, though resembling others of this type, is worth careful inspection, as a number of details have been perfected. The bearings, for instance, are on the stuffing-box principle, whilst the gears are machine cut.

The head office and foundries are situated at Cox Street, Coventry, with an engineering department near by, in West Orchard Street. The Blackfriars Foundry Requisite Company act as agents for the London area. The personnel in attendance on the Stand consists of Mr. D. W. Lennox (managing director) and Mr. D. G. Lennox (director).

The Lilleshall Company, Limited.—This important Company have on their Stand a fine range of pig-iron, glazed bricks and fire bricks.

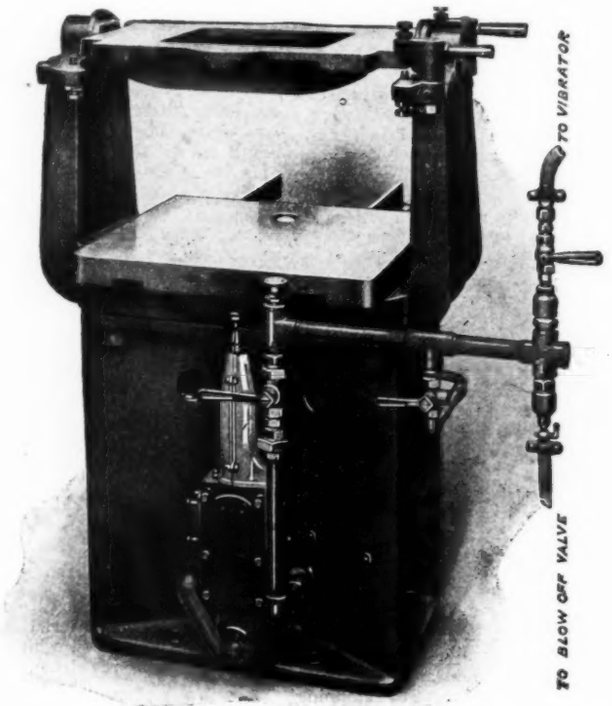


Fig. 31.—Jar-ram Turnover Machine— Britannia Foundry Company.

Continental visitors will be interested to learn that as far back as 1878 the firm was awarded a gold medal for its quality of pig-iron. It has been the endeavour of the directorate to improve, year by year, on the standard of their products.

The head office is at Prior's Lee Hall, near Shifnal, Shropshire, the London office being at 25, Victoria Street, S.W.1.

Penicud & Company, Paris.—This exhibit is confined to a representative display of crucible furnaces and graphite crucibles.

Messrs. Penicud, father and son, who, by the way, are English resident in Paris, have come over personally to take charge of the Stand.

Universal System of Machine Moulding & Machinery, Limited.—The object of the exhibits on this Stand is to express in a concrete manner the firm's methods for continuous casting. On the Stand is installed a sand conveyor, under which are situated five hoppers. These hoppers

Mr. E. V. Ronceray (*Managing Director*).

Mr. A. S. Beech (*Director*).

are fitted with a movable mouth so that the operator of the moulding machines can immediately get a supply of sand automatically into his moulding box by the mere pulling of a handle. Underneath these automatic hoppers

Mr. L. J. Tichelly (*Assistant Manager*).

are situated five different types of moulding machines. Four of these machines, however, are working hydraulically and the other one with compressed air.

Round about these machines is placed a mould conveyor of the roller type. The moulds produced by the moulding machines are put on to this roller conveyor and travel right round the Stand, follow a "U" formation, to a knocking out grid. Here the moulds are knocked out and the sand falls down into a bin. At the bottom of this bin the sand is picked up, by means of elevating buckets, and elevated to the top part of the Stand. At the exit of the elevator is a patented disintegrator, which re-conditions the sand, and from this disintegrator the sand falls on to the travelling belt and is re-conveyed back to the machines, thus making a complete cycle of automatic operations.

Amongst the moulding machines being shown is the well-known D.F. 4 machine, which rams the top and bottom parts of the mould simultaneously; withdraws the pattern plate; closes the boxes and eventually pushes the mould completely through the box. This is claimed to be the fastest machine in existence for its particular class of work, which is of a small, flat, shallow character.

O.H. 5 Machine.—This machine is for making deeper work, and works in conjunction with the R. 5 rollover machine. The O.H. 5 machine makes the top part of the mould and the R. 5 roll-over machine makes the drag side of the mould. Both of these machines are fitted with a new type of patented down-sand frame, which it is claimed, has increased the production power of moulding-machines materially, giving, where needed, adequate ramming density, especially under bars, thus eliminating any hand tucking. It cuts the gate in the mould automatically during ramming.

Type A.F. 40 Machines.—This machine is of recent design for making large flat stove-plate work. There are many of these types of machines operating in various parts of the world and it is claimed for the machine to have solved the difficult problem of the manufacture of stove-plate work. All these machines are operated by hydraulic pressure.

The last machine is also of a new type, which has only just been put on to the market after undergoing a series of severe tests. It has been designed to meet the demands of many foundries which have compressed-air installations but not hydraulic pressure. It is an improved type of what the Americans call a "Power Squeezer." It rams the top and bottom mould, both by

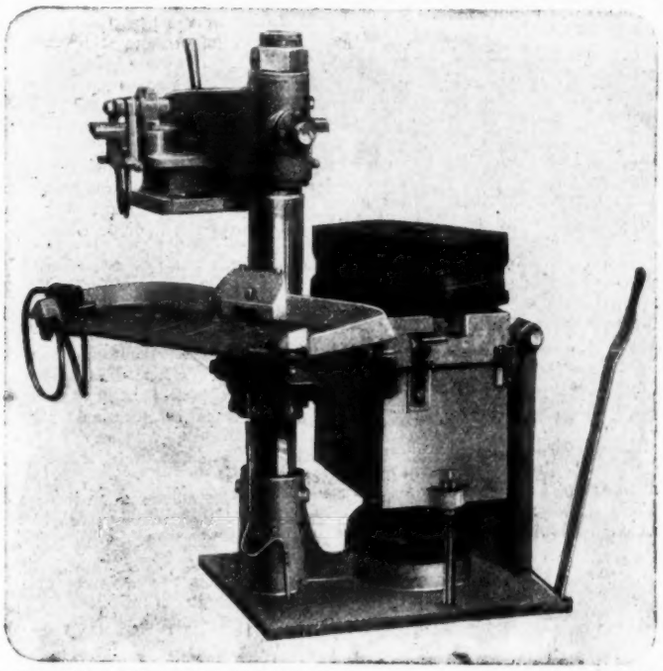


Fig. 32.—The DF 4 Moulding Machine—Universal System of Machine Moulding.

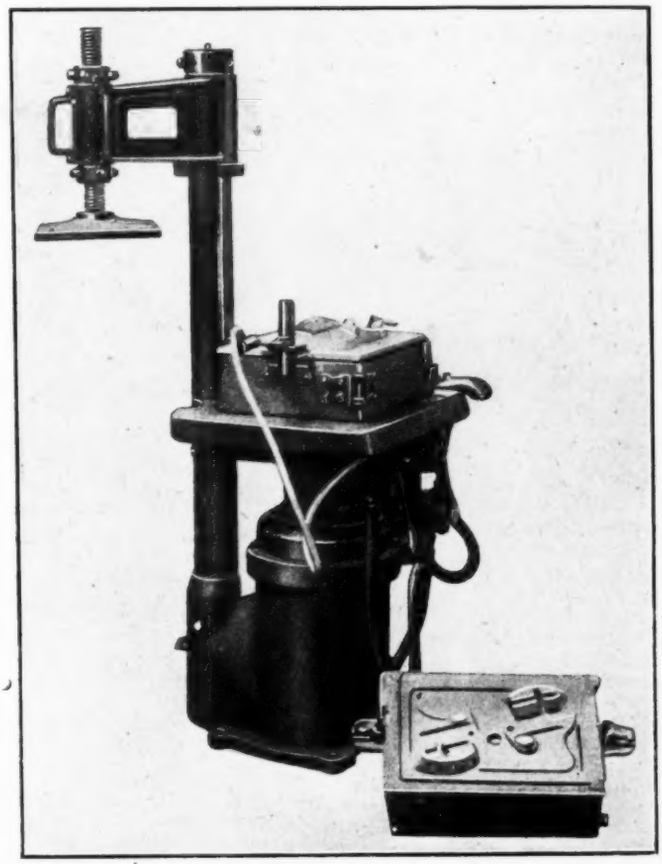


Fig. 33.—The P. Type Machine—Universal System of Machine Moulding.

jolting and squeezing. The aluminium-pattern plate is drawn by hand, with the aid of a vibrator operated by compressed air. It works with a snap flask and, consequently, moulding boxes are eliminated. Its main use is to fill a gap between the D.F. 4 flat-shallow machine and the deeper type of O.H. 5 and O.H. 3 machines. In other words, it can be used for the manufacture of medium depth of work. Both sides of the mould can be jolted and squeezed and the speed of production is very great.

A second Stand is taken up by pumps, accumulators and compressors for working the moulding machines and plant. On this Stand, also, a number of the latest type of Exo all-steel pulley blocks. These triple-geared blocks are made from the best steel, case hardened and cut from the solid—the only casting in the block being the cast-iron hand-chain wheel.

The head office of the concern is situated at 13/15, Wilson Street, London, E.C.2, whilst the works are located in a Paris suburb—Choisy-le-Roi. Sales agencies are spread all over the world. The Stand is in the charge of Mr. A. S. Beech, who will have with him M. E. Ronceray, the managing director of the French Company. Mr. L. J. Tichelly will also be on hand, mainly to give information on the pulley-block side of the business. The works at Choisy are always open for inspection by *bona-fide* foundrymen.

The Soldo Company.—This Stand is devoted entirely to a patent tinning compound called "Soldo." It has been reported upon by the National Physical Laboratory. Their Report concludes with the following remarks:—

"By means of 'Soldo' compound the following metals examined have been effectively and readily 'tinned'—phosphor-bronze, manganese-bronze, steel, cast iron, ohmal (nickel 3.5, manganese 9.0, copper 87.5 per cent.). Microscopic examination of joints has shown interpenetration between metal and tin in all cases. With manganese-bronze the extent of the interpenetration has been observed to be 4 or 5 times, and with phosphor-bronze approximately twice as great as when an ordinary workshop method of tinning was employed. With steel, the relative extents of interpenetration, using 'Soldo' and an ordinary workshop method, respectively, were approximately equal. Effective tinning of severely rusted steel and rusty cast iron has also been accomplished by means of 'Soldo,' the rest being removed and interpenetration between tin and steel or iron obtained, illustrating in a marked manner the cleansing properties of the compound."

We illustrate two typical microstructures of the results obtained.

The headquarters of the Company are at Sicilian House, Southampton Row, London, W.C.1. The proprietor, Mr. E. J. Boyle, is personally taking care of the exhibit.

Pittevil & Company.—This Stand is representative of the best Continental foundry equipment. That unique sand mixer, known as the "3 in 1," is again being shown. It comprises, in a self-contained unit, a rotating sifter for old sand, a mixer, a fan mill and a disintegrator incorporating a system of a fixed and moving discs. A further feature is an automatic water sprayer. Flexibility is obtained by the ability to eliminate the disintegrator when preparing loam, by portability, and by the ability to discharge into the floor or a conveyor. It is motor driven.

Portable mould-drying stoves have become so efficient in recent years that some founders have decided that they cannot do better than to install them at the side of permanent structures for drying moulds and stoves. The one shown on this Stand is of modern design and construction, and incorporates coke as a fuel. It is claimed to produce no dust, which allows drying to continue up to the last possible minute. It is motor driven and is made in two sizes.

In recent months much interest has been taken in ladles. No longer is the foundry owner content with those which served his grandfather. They were not engineering jobs. The ladles shown on this Stand have totally-enclosed gearing running in an oil bath, roller bearings at the bottom of uprights and other common-sense features.

Sand is shown as a reminder that this firm is one of the largest importers (or should it be exporters) of Belgian sands. Their utility is demonstrated by a series of steel castings made from their use.

The personnel attached to the Stand is Mr. Sydney Evans (British agent), Mr. Paul Fassotte (of Brussels) and a number of local agents, including Mr. Anderton Wardle, Mr. Goddard, Mr. Woolly, Mr. Fender, Mr. Reed and Mr. Rennie. The head office is situated at 1, Champs de Mars, Brussels, and the London office at 22/23, Laurence Pountney Lane, E.C.4.

McNab & Company.—It is regrettable that in this case we can only enumerate the machines to be shown. The comprise a Tabor patent 22-in. portable shockless-jarring moulding machine, a Tabor 14-in. by 16-in. "split pattern" machine, a 13-in. jar-squeeze column-type machine, a 20-in. plain-jarring stripping machine, a 10-in. plain-jarring squeezing stationary machine, a 10-in. plain-squeezing portable machine and a No. 1 size core-making machine. For the fettling shop there are being shown a sand-blast tumbling barrel, a rotary sand-blast machine, a sand-blast chamber and an "original" portable centrifugal sand-cleaning, aerating and mixing machine.

Sand preparating is represented by a No. 2 and 3 sand-treating, mixing and milling machine, a "Passe-Partout" mixing, rubbing machine for mixing oil sand, and a portable centrifugal sand-aerating machine.

Their head office is at 180, High Holborn, London, E.C.1.

The Rotary Air Compressor Company, Limited.—The exhibits on this Stand consist of an *Electrically-driven Direct-coupled Rotary Air Compressor*, having a capacity of 610 cub. ft. per min., suitable for all pressures up to 60 lbs. per sq. in. This type of compressor is suitable for operating sand-blast machines, rammers, pneumatic tools, etc. They are also manufactured in the two-stage type, suitable for pressures up to 120 lbs. per sq. in. A smaller size of the same design of compressor is also exhibited.

A *Small Electrically-driven Paint-spraying Equipment*, portable, complete with clarifiers, reducing valve and paint pistols.

As cupola plant is being modified very largely throughout Europe, special attention should be paid to the potentialities available for this section of the industry.

Mr. A. M. Warlow, Mr. V. H. Jackson and Mr. S. R. Blades are sharing the duties of attending to the Stand. The head office is 12, Victoria Street, S.W.1.

J. B. Corrie & Company, Limited.—This firm is exhibiting a film showing the Baillot system of continuous moulding. Their offices are at 15, Victoria Street, London, S.W.1.

The Top Layer is Manganese Bronze, the next phase is a Copper-Tin Alloy, whilst the Bottom Layer is the Tin in both Micros.

Fig. 34.—Manganese-Bronze tinned by "Soldo" × 600.

Fig. 35.—Manganese-Bronze tinned by Ordinary Method × 600.

Other Exhibits.

Owing to matters beyond our control, the description of a few exhibits has had to be left over until next week, principally that of the Badische Maschinen Fabrik, who have an important Stand. Others omitted include MacDonald of Nitshill, Glasgow, who are showing a number of moulding machines, as are also Gustav Zimmermann; Blackfriars Foundry Requisite Company, who include a line of pneumatic tools; and H. C. Slingsby, of Kingsway, with a representative show of transport apparatus. The machine-tool section and a description of the technical and educational exhibits are also left to a future issue.

Overseas Visitors on Tour.

FOUNDRIES INSPECTED IN MANCHESTER AND EAST MIDLANDS.

The overseas visitors to the International Foundrymen's Congress, who have been taking part in the tour through Great Britain, arrived in Manchester last Thursday evening. On the following day they visited a number of foundries and engineering establishments, of the Metropolitan-Vickers Electrical Company, Platt Bros., Limited, the Farington Steel Foundry of Leyland Motors, and John Hetherington & Sons. Arrangements had been made for sight-seeing and shopping by the ladies in the party, and the places visited included two educational institutions of which Manchester is particularly proud, the John Rylands library and the Cheetham Hospital.

Complimentary Banquet.

In the evening, at the Midland Hotel, a dinner in honour of the overseas visitors was given by the Lancashire Branch of the Institute. The chair was taken by Mr. E. Longden, the Branch-President, and he was supported by members of the Reception Committee. Among them were Colonel G. Westcott, the Right Hon. the Lord Mayor of Manchester, accompanied by the Lady Mayoress, Mr. D. Adamson (President of the Institute of Mechanical Engineers), Mr. W. G. Gass, Mr. G. E. Bailey, Mr. R. W. Stubbs, Mr. J. S. G. Primrose and Mr. H. Stead (Branch-Secretary). Electioneering exigencies and other reasons were responsible for the absence of other members of the Reception Committee who sent letters of apology. They were the Rt. Hon. the Earl of Derby, the Rt. Hon. Arthur Henderson, M.P., Major-General Sir Phillip A. M. Nash, Sir Christopher Needham, Sir Edwin Stockton, Mr. E. V. Haigh, Mr. B. Mouat Jones, Prof. Thompson and Mr. R. W. Kenyon.

An American Appreciation.

After the loyal toast had been honoured, "The City and Trade of Manchester" was proposed by MR. A. E. HAGEBOECK (Director, American Foundrymen's Association). He said one lesson that he personally would take back to the States was that of courtesy. In the British Islands even the "cops," the controllers of traffic, were models of that virtue. He and his friends were watching preparations for the celebration of the King's birthday, and stood at a point where many people were trying to get through; for three-quarters of an hour not a minute passed without ten or a dozen people making the attempt. The American policeman would have bawled out peremptory orders; the Englishman acted with perfect politeness. "Sorry, madam, but you cannot go through here. Please go round the other way." It was a lesson in courtesy which Americans could emulate.

He came over on the "Carmania." There were 30 in the party, most of them making their first crossing, so they had acquired much new experiences. One thing that was rather remarkable was that they had been in England a fortnight and had not had rain. (Laughter.) They had been much impressed by what they had seen in the foundries they visited, and would return to America with much information which could be made very valuable. So they were very glad they had come. That day he had seen some of the largest moulds being made that he had ever come across, and he had been in many foundries in the States. They weighed many tons. Then they saw where light castings were made, of very small size. That department also was second to none that he had seen.

Lord Mayor on Manchester as an Industrial Centre.

In responding to the toast, the LORD MAYOR said, as Chairman of the Watch Committee of Manchester, he appreciated very much Mr. Hageboeck's praise of the friendly and forbearing spirit in which the police carried out their duties. It had been intended to give the visitors a civic welcome in the Town Hall, and arrangements were fully made for the purpose, but they had to be cancelled when the General Election came. Manchester was the largest industrial centre in this country. In the city itself the day population numbered a million. Within a radius of 50 miles the population was 10 millions. It possessed the finest transport facilities. Seagoing vessels came up the canal, 30 miles and more, into the heart of the city. Next month six destroyers would arrive. Railways centred in it in a way with which no other part of the country could compare, whilst roads led to all parts. It was the first air port, and had developed, in a way which no other city or district had equalled, a system of carrying goods from or to the city by air. He hoped the visitors would go back convinced of these things. Then their visit would not have been in vain, but would be productive of good to themselves and to Manchester people also.

Industry as Keynote of International Amity.

MR. T. MAKEMSON, the General Secretary of the Institute, proposed "Our Guests." He said he sent out to the seven Branches of the Institute the programme for the tour, showing the amount of time which would be spent by the visitors in the district of each Branch. Within a very few days he received from all replies phrased in very similar terms: "It is an excellent programme, but we cannot understand why you have devoted so little time to our city and so much time to the others." That showed that in every centre visited the local members of the Institute would be overwhelmingly anxious to welcome the visitors make their stay as interesting and enjoyable as possible.

The visitors came from every part of the United States, from Chicago in the North to Alabama in the South, from New York in the East to California in the West. There were also visitors from Germany, Czecho-Slovakia, Poland and Italy. All were welcome. European industrial life generally was benefiting in many ways from American influences. It had grown up from small beginnings, and was organised on a more individualistic basis than American industry, and in many cases specialisation could not be applied to the same extent. But since the war European industrialists had realised there was room for considerable modifications in their methods, and they turned to America very largely for inspiration, for ideas, for help. As far as he knew, they never did so in vain. In every instance Americans had shown European visitors all that was being done, and given them all the information sought. It was done freely and gratuitously for the development of industry generally, and the Old World profited by the way in which ideas had been thought out and worked out in the New World. Very largely because of the generosity which America had shown to Europe in this respect there was a strong desire among British foundrymen to do something in return; even if the visitors could not be shown much that was new and helpful, they would at least be interested in seeing the efforts made to profit by the advice and help which had been received.

In addition to Americans there were in the party gentlemen from the Continent. He did not think anyone could see the industrial developments which were taking place there without feeling considerable admiration for the way in which those countries had recovered from the ravages of the war, and for the initiative, enterprise and energy with which the problem of reorganising industry had been grappled with. It was an outstanding achievement of the 20th century, and would have far-reaching effect. Much was said by politicians about the need for mutual understanding between the nations, so that their relations with one another might be happier in the future. He quite agreed with the efforts being made in that direction. But they could not accomplish much unless the politicians had behind them a united and enlightened public opinion, and he knew no better way of creating and fostering that enlightened public opinion that the interchange of visits by the inhabitants of the various countries. Friendships were created, prejudices were dispelled. Universal peace, if it were ever brought about, would result not from the efforts of politicians, but from professional men, business men, men of all kinds in different countries, associating together and learning to know one another better. (Applause.) In entertaining the overseas visitors on this occasion, the Lancashire Branch of the I.B.F. was making its modest contribution to the promotion of that spirit; he hoped it would become a cherished memory and often be recalled in later years.

Common Problems.

MR. F. ERB (President-Elect, A.F.A.) said the American visitors had a particular regard for Manchester, because of their recollections of Mr. Oliver Stubbs, and they heard with much regret that that gentleman was seriously ill. This was his first expedition overseas, and his reason for coming was that it was an opportunity to meet many foundry people under favourable circumstances. The delegates had visited many foundries, and had been made most welcome, and he was sure every member of the A.F.A. wished to give to their British friends a cordial invitation to visit them in the near future. As foundrymen they had to face the same problems, whether they were in America or in Europe. Being progressive, they were trying to do better. Science was taking its place in the industry, and they recognised and utilised the work of the foundry research engineer. Obsolete machinery was being replaced. It was commonly said nowadays that foundries were run as machine shops, using machine-shop methods. Improvements were wanted which were economically sound. In that respect they learned from experience, and he remembered that at one foundry shown they were told certain equipment would not be repeated because it was found the expense was not warranted. Foundry success was dependent on the ability of the men who did the work, and often it was the combination of men, who individually had not outstanding ability, but worked well together, which made the major success. There seemed to be no room in the industry for the self-centred man. The interchange of visits internationally, and also locally, tended to inspire better craftsmanship, and as a consequence to strengthen and improve industry, and he assured Mr. Makemson that the A.F.A. delegation, and also the other guests from the Continent, fully shared the sentiments which had been expressed.

MR. BERNHARD DANGO, JUN. (Germany) also replied to the toast, expressing cordial agreement with what had been said regarding the need for co-operation between technical institutions and organisations in different parts of the world.

MR. D. ADAMSON, President of the Institution of Mechanical Engineers, proposed the toast of "The Lancashire Branch." He said it was about five years since, as President of the Manchester Association of Engineers, he was a guest at the annual dinner of the Lancashire Branch, and proposed the toast of the Institute of British Foundrymen. It was replied to by Mr. Oliver Stubbs, to whom Mr. Erb had made touching reference. All who knew him were very sorry that he could not be with them on that occasion.

American Technical Work Appreciated.

There was no real need to propose the health of the Branch, because it was evidently full of life. He gathered that it was the largest Branch of the Institute; it was certainly most active. One interesting feature of its activities was the Junior Section, the object of which was to encourage the younger men to take an interest in the scientific and theoretical aspects of foundry work. The necessity of doing something in that direction was obvious to all who had to do with the foundry industry. Mr. Erb had mentioned that science was taking its place in the foundry. The Branch kept its members in touch with the progress of science, and did a great deal to increase the co-operation between the scientist and the practical moulder. That was not easy work. In the foundry industry, as in other branches of engineering, it was difficult to apply scientific solutions, because of the inertia of the people concerned. The technical publications issued by American societies were most valuable. He was a member of several of the societies, and benefited very much from reading their proceedings. Although not a member of the American Foundrymen's Society, he occasionally read its publications, and found them very informative.

The Engineering Aristocrat.

The Chairman said the Lancashire Branch certainly claimed to be the largest and most active in the Institute. For the Institute itself, he claimed that there was no other institute in the country which did more good work, or which had a wider field. It surprised him that more of the young men in the foundry did not take up the study of the entrancing aspects of foundry work. This country produced some of the finest workmen in the world, and the Lancashire Branch had provided good men for various executive positions and for important posts in the metallurgical and foundry world. Men who had gone over to America had been welcomed and were doing well; when he was over there, he was surprised to find Britishers holding important posts wherever he went. He recollected that before the war, in some correspondence regarding an advance of wages which was published, one writer referred to foundrymen as the men who prepared the raw material for the higher skilled labour in the engineering trade. He did not agree with that description; he preferred to say that the foundryman was the aristocrat of the engineering trade. Other departments were becoming mechanicalised, and the men employed in them tended to become machine-minders. That was not so with the foundryman.

Mr. S. T. Johnston, President, American Foundrymen's Association, said it was the desire of the American delegation to send their good wishes to Mr. Oliver Stubbs, whom they had known in the States and found to be a gentleman of fine character in every way. It was a great disappointment to himself personally not to have the opportunity of renewing acquaintance with Mr. Stubbs, and his disappointment was shared by the other members of the delegation.

The Chairman replied that these good wishes of the visitors would be passed on to Mr. Stubbs. They were fully shared by the members of the Lancashire Branch.

THE EAST MIDLANDS PROGRAMME.

The overseas delegates who are attending the International Foundry Congress were entertained on Wednesday and Thursday last by the East Midlands Branch of the Institute of British Foundrymen, secretary and the officials.

An early start was made on Wednesday. Shortly after 9 a.m. the visitors were met by Mr. S. H. Russell, President of the Institute (Leicester), Mr. C. Blades (Syston), Mr. H. Pemberton (Branch-President), of Derby, and Mr. H. Bunting. In the morning they were conducted over the famous Rolls Royce Works and those of the Combustion Engineering Company. During the afternoon they visited Messrs. Ley's Malleable Castings Company, and at each place expressed their appreciation of all they saw, and especially commented upon the highly efficient labour that was employed.

The visitors were entertained to lunch at the Assembly Rooms, Derby, the chair being occupied by Mr. Ian F. Panton, of Ley's Malleable Iron Company, and among others present were the Mayor of Derby (Councillor J. Ferguson Bell), Mr. A. Wormold (of Messrs. Rolls Royce) and Mr. R. Greenwood (of the Combustion Engineering Company).

Civic Luncheon.

In extending a civic welcome to the visitors, the Mayor said that to him it seemed to be specially appropriate that Derby should be one of the towns visited, because centuries ago Derby was noted for its iron industry; in fact, one of the streets in the town was called Irongate.

Mr. S. T. Johnson (President of the American Foundry Association), who responded, appreciated all that had been done for the visitors during their brief stay in Derby.

The hosts and guides were accorded a vote of thanks, and Mr. I. F. Panton, of Messrs. Ley's, who responded, said they had only been too pleased to make the visits both interesting and instructive.

Complimentary Dinner.

In the evening the visitors were entertained to dinner at the New Bath Hotel, Matlock, Bath.

Following the loyal toast, submitted by Mr. H. Pemberton, who presided, that of "Our Guests" was drunk on the call of Mr. S. H. Russell (President of the Institute), who said that, on behalf of the East Midlands Branch, of which he was a member and a past-President, he wished to accord them a hearty welcome. He was delighted that circumstances had been so arranged that they were able to entertain them in that beautiful valley, as it was one of the most picturesque parts of Derbyshire. Its county town was the home of one of the great railway companies—the London Midland and Scottish—and he was glad to tell them that the President of the East Midlands Branch was the manager of its foundries. One of the great problems with the foundry industry of England was in attempting to solve the question of skilled labour and mass production. In respect to that question he was bound to admit that England had learned a great lesson from America. Still, at the same time England possessed some highly skilled workmen in the foundry industry. The foundries possessed many excellent moulders, and altogether the quality of the castings was very high indeed. Of course, some of the problems which confronted the foundry industry of England were almost identical with those in America. He was glad to say that, following the great depression through which England had passed, trade was now on the up-grade. It might be slow, but it was sure. It had, however, taken many years to accomplish, owing to the fact that many handicaps had confronted the industry. Many of their skilled workmen had gone to the war, and, naturally, it had taken rather a long time for them to settle down again. He was, however, convinced that England would continue to forge ahead. He appreciated their visit to this country, and was sure some good would emanate therefrom.

Mr. S. T. Johnson (President of the American Foundrymen's Association and President of the International Committee), in responding, said there was no doubt that the visitors had learned a lot that day; indeed, perhaps, some of them were beginning to look up. That day they had been employed on overtime. They started early, and it looked as though they were going to finish late. As a matter of fact, he could say they had been working three shifts. But what he wished to impress was that, if there were 36 hours in a day, there would not be one day that was too much for them, if they could always have days like they had had on that occasion.

Mr. Pavel Bacher (Czecho-Slovakia) also responded, and paid a personal tribute to all that had been done on behalf of the visitors. They had enjoyed every minute of their stay in the Midlands.

Mr. Fred Erb (Vice-President of the American Foundrymen's Association), who submitted "The East Midlands Branch," said he had been asked that day if the American visitors were having a busman's holiday. However, he did not understand it, but when it was explained to him he had to admit that ever since they left New York on May 10 their time had been occupied every minute. He thanked them for the hospitality that had been extended. He wished the Branch every success, and was delighted to have learned that it was one of the most active affiliated to the Institute of British Foundrymen.

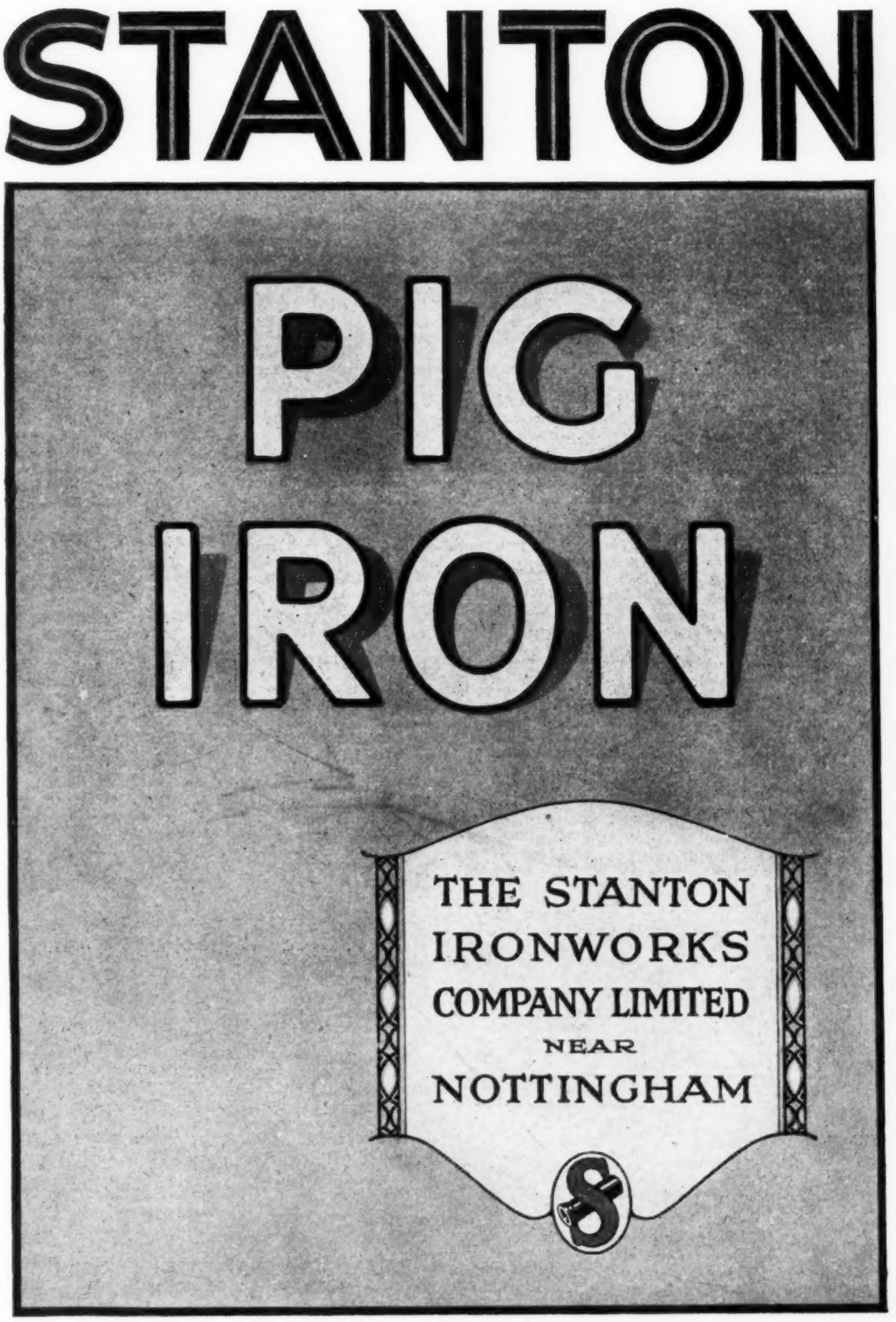
Mr. H. Pemberton (President of the East Midlands Branch), who responded, said he was glad to know that the East Midlands Branch had succeeded in its efforts to entertain them, and he hoped that their visit had not only served as a pleasure, but had been instructive as well. To his mind, such visits were all too brief. However, during their visit to Derbyshire they had been privileged to see and inspect the work in several of the foundries; therefore, they would understand what was actually produced. England had been passing through a very serious trade depression, but he was glad to say that conditions were now improving, and that the prospects for the future were indeed much brighter at the present time than what they had been for a long time past. It was, however, very slow, but still it was evident. England needed a trade revival—something to help forward the industries and reorganise them both in numbers and equipment. He was to visit America himself, and he hoped to return enlightened on various subjects concerning the industry.

Stanton Ironworks Activities.

Mr. E. J. Fox (managing director of the Stanton Ironworks), who toasted "The Secretary," paid a high tribute to the efforts of Mr. Bunting, whom he described as a model secretary. It was through his efforts that the Branch was in such a wonderful position to-day. He was looking forward to their American friends paying them a visit to the Stanton Ironworks, and for the benefit of their American cousins he would like to make a few remarks with regard to Stanton. Their operations, he said, were confined to the production of pig-iron, and ultimately to the production of cast-iron pipes. "In your country the manufacture of pipes is not so much in the hands of pig-iron makers, whereas we at Stanton confine ourselves to the production of the cast-iron pipes from the raw materials upwards. We pride ourselves, not, perhaps, due to our skill or plant, but that we make at Stanton the thing from start to finish. The Continent cannot touch us for costs, and that is largely due to the fact that our limestone and fuel are more or less in the same neighbourhood." Almost every day he had business dealing with America, and he thought they would realise that England was not always lagging behind in her productions. (Hear, hear.) For that reason he felt very proud to know that the centrifugal method of making iron pipes was developing at Stanton, although it had been taken up in America some two years after Stanton had been working hard. It was by frequent visits to this country that the United States Cast Iron Company developed the work on larger lines.

Mr. Bunting, in reply, said he, too, was looking forward to a trip to America in the near future, and, proceeding to refer to Stanton and its products, described it as a very progressive firm. His great ambition was to see the East Midlands Branch continue to grow.

XUM


STANTON
PIG
IRON
THE STANTON
IRONWORKS
COMPANY LIMITED
NEAR
NOTTINGHAM

Trade Talk.

The Denby Iron and Coal Company, Limited, have restarted additional blast furnaces.

Messrs. Andrew Weir & Company have placed an order with Messrs. Harland & Wolff, Limited, for two twin-screw motor cargo vessels.

After lengthy negotiations it has been decided to form a syndicate of Polish iron and steel foundries for the selling of castings and fixing prices.

It is expected that a delegation of the machinery-buying department of the Soviet Government will visit London to study the plant shown at the Foundry Exhibition.

Messrs. George Cohen, Sons & Company, Limited, machinery merchants, of 600, Commercial Road East, London, E.14, have established agencies in Bombay and Calcutta for the development of their export business.

Messrs. Henry Richmond & Sons, Limited, malleable iron founders, of Trafford Park, Manchester, have returned to Leeds, where their business was successfully carried on for many years. The firm's address, therefore, is now Carr Crofts, Leeds.

The Blackfriars Foundry Equipment Company, Limited, of Norfolk Street, Strand, W.C.2, have been appointed selling agents for the South of England for Messrs. T. Fearnley, Allen & Son, of Norwich Union Chambers, Birmingham. This mainly concerns the Gutmann sand-blast apparatus.

About 400 of the employees have applied for, and been allotted, over 5,000 7½ per cent. cumulative participating "A" preference shares of £1 each in Darwins, Limited, Sheffield. The worker shareholders pay 2s. 6d. down on each £1 share, and the balance in 50 weekly instalments.

The Empress Foundry at Mytholmroyd, Yorks, together with the whole of the plant, machinery and stock, was offered for sale by auction recently. For the building, exclusive of plant, a final offer of £3,750 was made, but not accepted. The stock and machinery were sold in lots.

It is officially stated that Messrs. Palmers Shipbuilding and Iron Company, Limited, will restart their two blast furnaces in the middle of June. Work will also be resumed at the company's ironstone mines in Cleveland. Nothing has yet been decided in regard to the starting of the steelworks.

Mr. Benjamin Talbot, deputy-chairman and managing director of the South Durham Steel and Iron Company, Limited, stated last week that they had decided to reopen one of their new plate mills at the Malleable Works, Stockton, and he anticipated that it would be in operation within the next few weeks.

In connection with the Advertising Convention to be held at Newcastle-on-Tyne from June 15-19, an "Industrial Press" Session will be held. The "Quest of Markets" is the theme of the Convention, and the speeches at this session should provide manufacturers with points of interest to them in so far as they are concerned with the industrial Press.

The Ministry of Transport Report on the accident near Blackpool on January 6, when two girders of a bridge in course of erection fell on a passenger train, was issued last week. Colonel A. C. Trench, the Inspector, states that the steel supplied was of inferior quality, and that its method of manufacture did not comply with that laid down for "A" steel, which alone should be used for bridge work.

Messrs. Schneider et Cie, of Le Creusot, have made an agreement with the Westinghouse Electric and Manufacturing Company and the Westinghouse Electric International Company, both of New York, with a view of undertaking in France the construction of electrical equipment under the Westinghouse patents and processes. A special French company, which will take up the work of the Schneider branch establishment at Champagne-sur-Seine, is now being constituted to give effect to that agreement.

The Central Board of the Shipbuilding Employers' Federation met at Carlisle to consider the recent demand of the shipyard trade unions for an advance of 5s. per week in wages. It was stated at the close that the Board had decided to refer the application to their constituent local associations. When they have obtained the views of the associations another conference will take place with the unions. The unions claim that the advance is warranted by the improvement in shipbuilding, but the employers contend that the industry is still far from prosperous.

Owing to the modern development of blast furnace practice, a number of old-type furnaces have been dismantled during recent years. Messrs. Thos. W. Ward, Limited, of Sheffield, have dismantled furnaces at Middlesbrough and Netherton during the last twelve months, and we understand they have arranged to take down the Erewash blast furnaces near Ilkeston. The Erewash furnaces were for many years a landmark on the L.M. & S. Railway, near Trowell Station, and a familiar sight to passengers on the main line between London and the North.

The deputation of the Federation of British Industries, which is visiting Spain to discuss with the Spanish Government matters of general interest to the trade of the two countries, left last week for Madrid. The deputation is led by Lord Gainford, past-President of the Federation of British Industries, and includes Mr. W. A. Lee (secretary of the Mining Association of Great Britain), Colonel Garrett (Agricultural Engineers' Association), Mr. A. MacKinstry (Metropolitan-Vickers Electrical Company, Limited), and Mr. C. F. I. Ramsden, of the Overseas Organisation of the Federation of British Industries.

The marriage took place, at St. Barnabas Church, Heaton, Bradford, recently, of Mr. Norman W. Green, a director of Charles Haley & Company, Limited, ironfounders, of Bradford, and vice-president of the Bradford and District Association of Master Ironfounders, to Miss Lily Linford, younger daughter of Mr. Charles Linford and the late Mrs. Linford, of Bingley. The ceremony was performed by the Rev. Canon R. Whincup, M.C., Vicar of Heaton, and the presents included a handsome gift from the Bradford and District Association of Ironfounders. The newly married couple left for a motor cruising honeymoon tour of the Norfolk Broads.

The floating crane built at Workington by Messrs. Cowan, Sheldon & Company, Limited, of Carlisle, and which left the Prince of Wales Dock on May 16 for Suez in tow of the German tug "Allas," came to grief in the Bay of Biscay recently. According to information received in Workington, bad weather and high seas were encountered, and the steel struts supporting the 112-ft. jib collapsed. The captain of the tug attempted to make the port of Brest, on the French coast, but the jib, now lying on the deck, toppled into the sea, carrying with it the control cabin and other upper structure. The tug and pontoon arrived safely at Falmouth, and it is probable that the pontoon will be brought back to Workington. It is understood that this is the third crane built by British engineers for service in the East to be lost at sea in three years.

The Grinding and Pulverising Offices of International Combustion, Limited, 11, Southampton Row, London, W.C.1, report that new orders have been received for the following equipment:—For England: Six 10-ft. by 48-in. Hardinge ball mills and six 7½-ft. Hardinge superfine classifiers, for grinding coal; one 8-ft. by 60-in. Hardinge pebble mill and one 6-ft. Hardinge superfine classifier, for grinding carbon black; one 3-ft. by 18-in. Hardinge pebble mill, for grinding barytes; one Raymond-Lopulco mill, for grinding coal; and two 4-ft. by 5-ft. Hum-mer screens, for screening coke. For Spain: Two 10-ft. by 60-in. Hardinge ball mills, for grinding chlorite ore; one 4½-ft. by 16-in. Hardinge ball mill, for grinding limestone; and three five-roller Raymond mills, for grinding lignite. For Africa: Three 8-ft. by 60-in. Hardinge ball mills and three 6-ft. Hardinge air classifiers, for grinding coal; and one 4½-ft. by 13-in. Hardinge ball mill, for grinding quartz rubble. For India: One 7-ft. by 22-in. Hardinge ball mill, for grinding lead/zinc ore. For France: One three-roller Raymond mill, for grinding mineral ore; one 6-ft. by 22-in. Hardinge ball mill, for grinding lead/zinc ore; one 6-ft. Raymond separator, for separating aluminium dross; four 4-ft. and four 8-ft. Hummer screens, for screening mineral ore; and two Raymond pulverisers, for grinding colours.

Obituary.

Mr. G. Hill, for thirty-eight years with F. Parkin & Sons, iron and brassfounders, of Barhay Road, Exeter, died recently at the age of 52.

Mr. John Arthur Barker, a member of the firm of Knowles & Company, iron founders and machinery manufacturers, of Manningham, Bradford, died on May 27, aged 44. Mr. Knowles was the son of Mr. Herbert Knowles, head of the firm. He became associated with the business 28 years ago, and was a member of the Bradford Ironfounders' Association and the Engineering Employers' Association of Bradford.

Reports and Dividends.

Stanton Ironworks Company, Limited.—Final dividend of 6 per cent. on the ordinary shares, making 10 per cent., tax free, for the year.

Burntisland Shipbuilding Company, Limited.—Profit, £17,584; brought in, £5,924; depreciation, £7,700; final dividend of 4 per cent., less tax, making 6 per cent.; carried forward, £7,934.

Electric Furnace Company, Limited.—Profit, £16,047; dividend at the rate of 7 per cent., less tax, on the preferred ordinary and ordinary shares, absorbing £6,469; written off preliminary expenses, £2,416; to general reserve, £5,000; carried forward, £2,160.

Broughton Copper Works (1928), Limited.—Profit, £68,857; brought in, £1,398; income tax, £9,000; preference dividends, £33,228; to general reserve, £8,000; to stock reserve, £6,000; dividend of 12½ per cent., less tax, on the ordinary shares, £12,500; carried forward, £1,527.

Summerlee Iron Company, Limited.—The balance at debit of profit and loss account amounts to £95,180, an increase of £54,586, which is the loss incurred during the year after providing for depreciation. The preference dividend for the year, absorbing £12,000, will be charged to the special reserve fund created to secure such dividends.

Allied Ironfounders, Limited.—The statutory report states that the total number of shares issued and allotted is 916,358 7 per cent. cumulative preference shares of £1 each and 918,956 ordinary shares of £1 each. Of these, 121,181 preference shares and 127,688 ordinary shares have been issued for cash, in respect of which the company has received £248,869, and 795,177 preference shares and 791,268 ordinary shares have been issued credited as fully paid up in part satisfaction of the purchase price of shares acquired in associated companies.

New Companies.

Universal Steel Drum Company, Limited, 10, Drury Lane, Liverpool.—Capital £2,000. Director: R. Wood.

Multifillers, Limited, 8, Dumfries Place, Cardiff.—Capital £20,000. Ironfounders, mechanical engineers, etc. Directors: E. G. Drabble, A. C. Macwhirter, H. V. Mielean, F. J. Phillips, and G. L. Ward.

Low Moor Iron, Limited.—Capital £60,000 in £1 shares, to acquire on the terms of an agreement between Thomas W. Ward, Limited, and British and Continental Traders, Limited, freehold land and buildings at Low Moor, Bradford, and to carry on the business of ironmasters, etc. Directors: W. J. Rees (nominee of British and Continental Traders, Limited), W. R. Lysaght (nominee of John Lysaght, Limited), O. F. Grazebrook (nominee of M. & W. Grazebrook, Limited), and J. W. Trowsdale (nominee of the Earl of Dudley's Round Oak Works, Limited). Solicitors: Bennitt & Grazebrook, 16, Waterloo Street, Birmingham.

Limited Partnership.

Scrap Metal Company, 24, Lime Street, London, E.C.—Partnership for seven years from May 14, 1929, or during the lifetime of W. H. Barnard, whichever shall be the shorter period. General partner: W. H. Barnard. Limited partners: J. H. Barnard, Sir Henry R. M. Bourne, and H. J. Young.

Wills.

Spear, A. G., of Moseley, brassfounder	£6,803
Miller, R. E., London Road Foundry, Edinburgh	£113,216
Wright, Charles, of Messrs. C. & C. Wright, iron and steel merchants, Boston, Lincs	£40,842
Renton, B. M., of Sheffield, head of Messrs. B. M. Renton & Company, Limited, iron and steel merchants, etc.	£64,291
Russell, Robert, of Skelmorlie, Ayrshire, late chairman and managing director of the Coltness Iron Company, Limited	£77,272
Wilkinson, F. S., of Dudley, foundry manager for Messrs. M. & W. Grazebrook, Limited, and a director of Messrs. F. Grazebrook & Company, Limited, iron and steel merchants ...	£4,934
Firth, Bernard A., chairman of Messrs. Thos. Firth & Sons, Limited, Sheffield, deputy-chairman of Messrs. John Brown & Company, Limited, a director of the English Electric Company, Limited, and other companies	£476,992

Sterling

SOLID RIBBED ROLLED STEEL

MOULDING BOXES

are recognised as standard box equipment by the leading foundries and engineering establishments in this country and overseas.

Because they speed up production, save unnecessary labour, produce accurate castings and make for all-round efficiency in the foundry.

SEE **THE STERLING STAND** AT THE **FOUNDRY EXHIBITION,**
Agricultural Hall, Islington, London, N.
JUNE 5th to 15th.
STAND No. 6, ROW C.

Sterling

FOUNDRY BARROWS

for

SAND, COKE, and PIG-IRON

are sturdily built to withstand the heavy duties and harsh treatment of the severest foundry service.

STERLING FOUNDRY SPECIALTIES LTD.

London Office :
13, VICTORIA STREET, S.W.1.

BEDFORD.

Telephone : 3345 BEDFORD.
Telegrams : "STERFLASK, BEDFORD."
Code : WESTERN UNION.

Iron and Steel Markets.

Pig-Iron.

MIDDLESBROUGH.—Political excitement having to some extent subsided, the Cleveland iron market has returned this week to more normal conditions, without, however, an immediate solution in prospect of the problem of providing adequate supplies to meet an increasing demand for the present inadequate outputs of local furnaces now in blast. The ironmasters are, however, heavily handicapped in this respect by the continued scarcity and high cost of raw materials, but at the moment are considering the question of putting additional furnaces in blast as soon as sufficient quantities of native ore are available in the Cleveland area. In the meantime it is satisfactory to note that even with the pressure of home demands continuing on the increase, the export side is by no means being neglected, shipments for May having been the heaviest for three years past. Fresh purchases of Cleveland pig-iron are still only possible through merchants, and, although there are no fixed prices, the figures generally quoted are as follow:—No. 1 Cleveland foundry iron, 72s. 6d. per ton; No. 3 G.M.B., 70s.; No. 4 foundry, 69s.; No. 4 forge, 68s. 6d. per ton. These prices are 1s. 6d. per ton above the makers' last fixed minimum scale, but not improbably an advance will be imposed when the makers resume trading.

Activity in the North-East Coast markets for hematite is fully maintained, extending alike to steelworks and foundry consumers, a form of rather unusual competition which must ultimately result in some readjustment of prices in sellers' prices. Merchants in the meantime are not keen sellers, but makers are steadily booking orders for the third quarter of the year at about 74s. for mixed numbers and 74s. 6d. for No. 1 quality. On the North-West Coast Bessemer mixed numbers are quoted at 75s. per ton works.

LANCASHIRE.—Local markets for foundry pig continue steady, with an expanding tendency in demand, while the recent movement by Midland furnaces to raise quotations by 1s. per ton all round is claimed as having been justified by results. Current quotations for delivery to local users are now on the basis of 72s. per ton for Derbyshire No. 3 foundry and 73s. for Staffordshire brands, with Scottish at around 91s. per ton.

THE MIDLANDS.—At a meeting of the local pig-iron makers in Birmingham last week, it was decided to advance the zone prices in this area by 1s. per ton. They are, therefore, as follow:—Derbyshire No. 3, 73s. 6d.; North Staffordshire No. 3, 74s. 6d.; Northamptonshire No. 3, 70s., all delivered to local stations. It was agreed also that the minimum extra for No. 1 grade should be 3s. per ton instead of 4s.

SCOTLAND.—Business in the market for Scotch pig-iron during the current week has been quiet, the local foundries still being very short of orders. The official price of No. 3 foundry quality is unchanged at 72s. 6d. per ton, f.o.t. furnaces, but several makers are not satisfied with this price and are quoting 73s. 6d.

Finished Iron.

At Birmingham this week the inquiry for Staffordshire marked bars has been maintained at a good level, and the demand from various sources for crown bars is somewhat better. There is, however, a dearth of business representing bulk tonnages. Marked bars are quoted at £12 at works and crown iron at from £9 10s. to £10. There is still little business developing for nut and bolt iron on account of Continental competition. The local works require for this grade of iron a figure of £9 and upwards, whereas Belgian No. 3 iron is available freely at between £7 2s. 6d. and £7 5s. delivered works in this district.

Steel.

At Sheffield this week the markets for steel have been rather quiet, with the call for basic billets the most active. A moderate tonnage of soft billets is coming from the Continent, but this makes little impression on the demand for British material. Siemens acid billets are very quiet again, consequent probably on the higher price fixed by the Association. Wire rod demands are somewhat smaller, and some mills are less well employed. There are no alterations in prices. Crucible steel makers report a falling-off of orders, and smaller export business in high-speed steel is increasing the competition for home orders. Makers of motor steel form one of the busiest sections of Sheffield industry. The tinplate market at the moment is rather easy, with quotations ranging as follow:—Coke qualities, 18s. 3d. to 18s. 9d. basis, net cash, f.o.b. Welsh ports.

Scrap.

The prevailing scarcity of pig-iron in the Cleveland area has had a stimulating effect upon markets for scrap metal, and on Tees-side the improved demand for heavy cast iron is well maintained, and buyers are now quite ready to pay 65s. per ton as a delivered price for ordinary, whilst machinery quality in handy sizes realises up to 67s. 6d. per ton. In the Midlands heavy cast-iron scrap in cupola sizes is in good demand at 72s. 6d. delivered, and 62s. delivered is offered for light cast-iron scrap. Markets for cast-iron scrap in Scotland are easy, and it is difficult to find outlets for first-class machinery quality at around 73s. 6d. Heavy ordinary cast iron is at about 67s. 6d., and old cast-iron railway chairs are at 68s. 6d. Heavy cast-iron scrap is at 66s. 3d., with light cast-iron scrap also easy at 66s. to 67s. 6d., all delivered works.

Metals.

Copper.—Movements in the market for warrant copper during the week current have disclosed few features of more than passing interest, though the tone, on the whole has been fairly steady. Consumers on the whole are not badly placed as regards supplies, and, although consumption is now on a very large scale, production is so heavy that it is well in excess of the consumption. Recent rumours of plans to curtail production have failed to impart any strength to the metal, and at the moment the future prospects show no sign of any appreciable change.

Closing quotations are :—

Cash.—Thursday, £73 8s. 9d. to £73 11s. 3d.; Friday, £73 12s. 6d. to £73 17s. 6d.; Monday, £73 2s. 6d. to £73 5s.; Tuesday, £73 17s. 6d. to £74; Wednesday, £73 18s. 9d. to £74.

Three Months.—Thursday, £72 7s. 6d. to £72 10s.; Friday, £73 to £73 5s.; Monday, £72 15s. to £72 17s. 6d.; Tuesday, £73 12s. 6d. to £73 15s.; Wednesday, £73 12s. 6d. to £73 13s. 9d.

Tin.—The market for standard tin of late has remained practically stationary, fluctuations in values having been only on a fractional scale, while consumptive demand both at home and abroad has been unusually quiet. With regard to the future, everyone awaits the result of the producers' meeting, and if as a consequence no regulation of the production is effected, then the market will still be dependent upon the group, who may or may not continue to provide support. On the whole the tendency is to await more definite developments.

Official closing prices :—

Cash.—Thursday, £196 7s. 6d. to £196 10s.; Friday, £196 5s. to £196 10s.; Monday, £197 12s. 6d. to £197 15s.; Tuesday, £198 15s. to £198 17s. 6d.; Wednesday, £197 10s. to £197 12s. 6d.

Three Months.—Thursday, £199 2s. 6d. to £199 5s.; Friday, £199 to £199 2s. 6d.; Monday, £200 12s. 6d. to £200 15s.; Tuesday, £201 10s. to £201 15s.; Wednesday, £200 7s. 6d. to £200 10s.

Spelter.—With buying confined within very narrow limits, the market for spelter continues without features of special interest, prices, however, remaining firm. Consumptive demand has been dull on the Continent as well as in this country, and producers generally make no pressure to sell, appearing to prefer to await an improvement in price.

Daily quotations are :—

Ordinary. — Thursday, £26 17s. 6d.; Friday, £26 16s. 3d.; Monday, £26 10s.; Tuesday, £26 10s.; Wednesday, £26 8s. 9d.

Lead.—Demand from consumers recently has been slack, and in consequence the market has been rather dull. Supplies continue to arrive steadily, with every prospect of soon being in excess. Nevertheless the tone of the market has been steadier, and some recovery would not be surprising.

Prices have been :—

Soft Foreign Prompt.—Thursday, £23 11s. 3d.; Friday, £23 11s. 3d.; Monday, £23 11s. 3d.; Tuesday, £23 13s. 9d.; Wednesday, £23 15s.

King's Birthday Honours.

The list of honours conferred by the King on the occasion of his 64th birthday includes the names of several men prominently associated with the foundry, iron and steel and allied industries.

SIR WILLIAM EWERT BERRY, who has been made a Baron, is a director of Messrs. Guest, Keen & Nettlefolds, Limited, and Messrs. John Lysaght, Limited.

SIR ARTHUR BALFOUR, K.B.E., J.P., managing director of Messrs. Arthur Balfour & Company, Limited, steel manufacturers, Sheffield, and chairman of High Speed Steel Alloys, Limited, Widnes, has been created a Baronet. Sir Arthur was chairman of the Committee which was appointed in July, 1924, to inquire into the prospects of British industry and commerce, and which presented its final report in March last. He was Master Cutler of Sheffield in 1911-12. Besides the Committee on Industry and Trade, Sir Arthur Balfour has been a member of numerous other commissions and councils, including the Royal Commission on Railways, Industrial Advisory Committee to the Treasury (1914-1918), Advisory Council for Scientific and Industrial Research (1917), Coal Commission (1919), Safeguarding of Industries Commission, etc. He was President of the Sheffield Chamber of Commerce in 1919 and President of the Association of British Chambers of Commerce in 1923-24.

PROFESSOR HENRY C. H. CARPENTER, F.R.S., whose name is among the new Knights, is Professor of Metallurgy in the Royal School of Mines, Imperial College of Science and Technology. Born in 1875, he was educated at St. Paul's School and Merton College, Oxford, afterwards going to the Universities of Leipzig (where he obtained his Ph.D.) and Manchester. He went to the National Physical Laboratory at the time of its foundation as head of the Chemical and Metallurgical Departments. He obtained the Carnegie Gold Medal for research awarded by the Iron and Steel Institute in 1905, and from 1906 to 1913 he was Professor of Metallurgy at the Victoria University, Manchester. Professor Carpenter is honorary treasurer of the Iron and Steel Institute, a past-President of the Institute of Metals, and a member of the Council of the Institution of Mining and Metallurgy. He is the author of numerous researches on metals and alloys in the "Proceedings" of the Royal Society, the "Journals" of the Iron and Steel Institute, the Institution of Mechanical Engineers, the Institute of Metals, etc.

MR. ROLAND T. NUGENT, director of the Federation of British Industries, has received a Knighthood.

MR. WALTER GEORGE KENT, C.B.E., chairman and managing director of Messrs. George Kent, Limited, engineers and founders, London, has also received a Knighthood.

SIR ARTHUR MCDOUGALL DUCKHAM, K.C.B., Chairman of the Economic Mission to Australia, has been made a Knight Grand Cross of the Order of the British Empire. Sir Arthur is chairman of the Woodall Duckham Vertical Retort and Oven Construction Company (1920), Limited, and its associated concerns.

MR. FREDERIC W. C. DEAN, who has been made a C.B.E., is Superintendent of the Royal Gun and Carriage Factories, Woolwich.

MR. ROBERT H. SCANES, general secretary of the Society of Motor Manufacturers and Traders, has been made an M.B.E.

Applications for Trade Marks.

"CENTRICAST." — Metals. Sheepbridge Stokes Centrifugal Castings Company, Limited, Chesterfield.

"ARDAL."—Aluminium alloys. Ardal Parent Company, Limited, 39, Corn Street, Bristol.

"PUREDELLE."—Spelter. The Delaville Spelter Company, Limited, Newton Chambers, Cannon Street, Birmingham.

F.T.J. 6.6.29

$3\frac{1}{4}$ cwts. or . . !

The casting illustrated, in aluminium alloy weighs $3\frac{1}{4}$ cwts. In iron it would weigh nearly half a ton. Thus a weight saving of approximately $6\frac{1}{2}$ cwts. was provided in this part alone.

(Illustration by courtesy of Sir W. G. Armstrong-Whitworth & Co., Ltd.).

FOR LIGHTNESS

B.A.Co. Ltd Aluminium

The B.A.Co.'s new booklet : Marine Construction—and/or their current Foundry data will be sent (gratis) on request.

The British Aluminium Co., Ltd. Aluminium Producers, Adelaide House, London, E.C.4.

London Warehouse : 34-38, Banner St., E.C.1. (Clerk. 5881).
Manchester : 274, Deansgate. - - - (City 1574).
Newcastle-on-Tyne : Milburn House. - (Cent. 1461).
Birmingham : 21, Barwick Street. - (Cent. 7714/5).
Leeds : 66, Kirkstall Road. - - - (Leeds 28343).
Glasgow : 113, West Regent Street. - (Doug. 3950).

WARNER'S CYLINDER PIG IRON

BRAND "WARNER C.B.R."

THE WORLD'S BEST

WARNER & CO. LTD.

CARGO FLEET,
MIDDLESBROUGH ON TEES.

As supplied to the leading....
RAILWAY COMPANIES, LOCOMOTIVE, DIESEL and OIL ENGINE BUILDERS.
Also unequalled for
AUTOMOBILE CYLINDER BLOCKS, COMPRESSORS, ENGINEERS' TOUGH CASTINGS and CHILLED ROLLS.

TELEGRAMS:
REFINERY MIDDLESBROUGH.

ALSO MAKERS OF
HIGH CLASS REFINED PIG IRON
IN SMALL PIGS, FOR ALL KINDS OF
MALLEABLE CASTINGS

TELEPHONE:
MIDDLESBROUGH 4265.

WEEKLY PRICE CURRENT.

COPPER.

	£	s.	d.
Standard cash	73	18	9
Three months	73	12	6
Electrolytic	84	5	0
Tough	75	5	0
Best selected	75	15	0
Sheets	112	0	0
India	95	0	0
Wire bars	84	12	6
Do. June	84	12	6
Do. July	84	12	6
Ingot bars	84	12	6
H.C. wire rods	86	15	0
Off. av. cash, May	75	2	6
Do. 3 mths., May	73	9	6 5/11
Do., Sttlmnt., May	75	2	4 7/11
Do., Electro, May	84	2	5 7/12
Do., B.S., May	76	19	8 5/12
Aver. spot price, copper, May	75	2	6
Do. wire bars, May	84	10	4 1/11
Solid drawn tubes			15½d.
Brazed tubes			15½d.
Wire			12½d.

BRASS.

Solid drawn tubes	13d.
Brazed tubes	15d.
Rods, drawn	12½d.
Rods, extd. or rlld.	8½d.
Sheets to 10 w.g.	11 3/8d.
Wire	11½d.
Rolled metal	10½d.
Yellow metal rods	8½d.
Do. 4 × 4 Squares	9d.
Do. 4 × 3 Sheets	9½d.

TIN.

	£	s.	d.
Standard cash	197	10	0
Three months	200	7	6
English	199	0	0
Bars	202	0	0
Straits	201	15	0
Australian	200	15	0
Eastern	203	15	0
Banca	203	5	0
Off. av. cash, May	197	12	8 6/11
Do., 3 mths., May	200	2	11 6/11
Do., Sttlmt., May	197	12	11 6/11
Aver. spot, May	197	12	8 7/11

SPELTER.

Ordinary	26	8	9
Remelted	25	0	0
Hard	21	15	0
Electro 99.9	30	0	0
English	26	17	6
India	23	10	0
Zinc dust (Nom.)	36	10	0
Zinc ashes	9	0	0
Off. aver., May	26	13	4 11/17
Aver., spot, May	26	14	6 6/11

LEAD.

Soft foreign ppt.	23	15	0
English	25	0	0
Off. average, May	23	16	11 19/22
Average spot, May	23	18	11 7/11

ZINC SHEETS, &c.

Zinc sheets, English	35	0	0
Do. V.M. ex whf.	33	7	6
Rods	42	0	0
Boiler plates	31	0	0
Battery plates	32	0	0

ANTIMONY.

Special brands, Eng.	50	15	0
Chinese	34	5	0
Crude	Nominal		

QUICKSILVER.

Quicksilver	22	3	9

FERRO-ALLOYS AND STEEL-MAKING METALS.

Ferro-silicon—			
25%	7	15	0
45/50%	12	0	0
75%	19	10	0
Ferro-vanadium— 35/50%	..13/- lb. Va.		
Ferro-molybdenum— 70/75% c. free	..4/- lb. Mo.		
Ferro-titanium— 23/25% carbonless	11d. lb.		
Ferro-phosphorus, 20/25%	£16	0	0
Ferro-tungsten— 80/85%, c. fr.	2/9 lb.		
Tungsten metal powder— 98/99%	2/11 lb.		
Ferro-chrome— 2/4% car.	£33	0	0
4/6% car.	£24	5	0
6/8% car.	£23	2	6
8/10% car.	£22	15	0
Ferro-chrome— Max. 2% car.	£34	0	0
Max. 1% car.	£37	5	0
Max. 0·70% car.	£40	15	0
70%, carbonless	1/2 lb.		
Nickel—99% cubes, or pellets	£175	0	0
Ferro-cobalt	9/4 lb.		
Aluminium 98/99%	£95	0	0
Metallic chromium— 96/98%	2/6 lb.		
Ferro-manganese (net)— 76/80% loose	£13	15	0
76/80% packed	£14	15	0
76/80%, export	£14	10	0
Metallic manganese— 94/96%, carbonless	1/6 lb.		

Per ton unless otherwise stated.

HIGH-SPEED TOOL STEEL.

Finished bars, 14% tungsten	£0	2	0
Finshed bars, 18% tungsten	£0	2	9

Per lb. net, d/d buyers' works.

Extras—

Rounds and squares, 3 in. and over	4d. lb.
Rounds and squares, under ½ in. to ¼ in.	3d. lb.
Do., under ¼ in. to 7/16 in.	1/- lb.
Flats, ½ in. × ¼ in. to under 1 in. × ⅛ in.	3d. lb.
Do., under ½ in. × ¼ in.	1/- lb.
Bevels of approved sizes and sections	6d. lb.

Bars cut to length, 10% extra

SCRAP.

	£	s.	d.	£	s.	d.
South Wales—						
Heavy steel				3	17	6
Bundled steel and shrngs.	3	12	6 to	3	16	6
Mixed iron and steel				3	12	6
Heavy cast iron				3	5	0
Good machinery for foundries				3	10	0
Cleveland—						
Heavy steel				3	5	0
Steel turnings				2	18	6
Cast iron borings				2	15	0
Heavy forge				3	15	0
W.I. piling scrap				3	10	0
Cast-iron scrap	3	5	0 to	3	7	6
Lancashire—						
Cast-iron scrap	3	2	6 to	3	10	0
Hvy. wrought				3	15	0
Steel turnings				2	17	6
Scotland—						
Heavy steel				3	15	0
Cast-iron borings				2	15	0
Wrought-iron piling				3	12	6
Heavy machinery				3	13	0

London—Merchants' buying prices delivered yard.

Copper (clean)	60	0	0
Brass	39	0	0
Lead (less usual draft)	20	10	0
Tea lead	17	0	0
Zinc	17	0	0
New aluminium cuttings	67	0	0
Braziery copper	51	0	0
Gunmetal	51	0	0
Hollow pewter	140	0	0
Shaped black pewter	105	0	0

PIG-IRON.

(f.o.t. unless otherwise stated.)

N.E. Coast—	
Foundry No. 1	72/6
Foundry No. 3	70/-
Foundry No. 4	69/-
Forge No. 4	68/6
Hematite No. 1	74/6
Hematite M/Nos.	74/-
N.W. Coast—	
Hem. M/Nos. d/d Glas.	83/6
„ d/d Birm.	91/-
Midlands—	
Staffs. common*	—
„ No. 4 forge*	70/6
„ No. 3 fdry*	74/6
Shrops. basic	—
„ Cold blast, ord.	—
„ „ roll iron	—
Northants forge*	66/-
„ fdry. No. 3*	70/-
Derbyshire forge*	69/6
„ fdry. No. 3*	73/6
„ basic*	—

* d/d Black Country dist.

Scotland—	
Foundry No. 1	75/-
„ No. 3	72/6
Hem. M/Nos.	78/-
Sheffield (d/d district)—	
Derby forge	64/6
„ fdry. No. 3	68/6
Lincs. forge	68/6
„ fdry. No. 3	72/6
E.C. hematite	85/-
W.C. hematite	87/-
Lincs. (at furnaces)—	
Forge No. 4	—
Foundry No. 3	—
Basic	—
Lancashire (d/d eq. Man.)—	
Derby forge	—
„ fdry. No. 3	72/-
Northants foundry No. 3	—
Dalzell, No 3 (special)	102/6 to 105/-
Summerlee, No. 3	91/-
Glengarnock, No. 3	—
Gartsherrie, No. 3	91/-
Monkland, No. 3	91/-
Shotts, No. 3	91/-

FINISHED IRON AND STEEL.

Usual District deliveries for iron; delivered consumers' station for steel.

	£	s.	d.	£	s.	d.
Iron—						
Bars (cr.) nom.				10	15	0
Nut and bolt iron	9	0	0 to	9	2	6
Hoops	11	0	0 to	11	10	0
Marked bars (Staffs.) f.o.t.				12	0	0
Gas strip	11	0	0 to	11	10	0
Bolts and nuts, ¾ in. × 4 in.				15	5	0
Steel—						
Ship plates	8	12	6 to	8	17	6
Boiler plts.				10	10	0
Chequer plts.				10	12	6
Angles				8	2	6
Tees				9	2	6
Joists				8	2	6
Rounds and squares, 3 in. to 5½ in.				9	2	6
Rounds under 3 in. to ¾ in. (Untested)				8	0	0
				and upwards		
Flats, over 5 in. wide and up				8	7	6
Flats, 5 in. to 1½ in.				7	17	6
Rails, heavy				8	10	0
Fishplates				12	10	0
Hoops (Staffs.)				10	10	0
Black sheets, 24g.				10	10	0
Galv.cor.shts., 24g.	13	2	6 to	13	15	0
Galv. fencing wire 8g. plain				12	0	0
Billets, soft	6	10	0 to	7	0	0
Billets hard	7	10	0 to	8	2	6
Sheet bars	6	5	0 to	6	10	0
Tin bars	6	5	0 to	6	10	0

PHOSPHOR BRONZE.

	Per lb. basis.
Strip	1/4
Sheet to 10 w.g.	1/5
Wire	1/6½
Rods	1/5
Tubes	1/9
Castings	1/4

Delivery 3 cwt. free.
10% phos. cop. £40 above B.S.
15% phos. cop. £50 above B.S.
Phosphor tin (5%) £30 above price of English ingots.
C. Clifford & Son, Limited.

NICKEL SILVER, &c.

	per lb.
Ingots for raising	10d. to 1/4
Rolled—	
To 9 in. wide	1/4 to 1/10
To 12 in. wide	1/4½ to 1/10½
To 15 in. wide	1/4½ to 1/10½
To 18 in. wide	1/5 to 1/11
To 21 in. wide	1/5½ to 1/11½
To 25 in. wide	1/6 to 2/-
Ingots for spoons and forks	10d. to 1/6½
Ingots rolled to spoon size	1/1 to 1/9½
Wire round—	
3/0 to 10 G.	1/7½ to 2/2½

with extras according to gauge.

AMERICAN IRON AND STEEL.

At Pittsburgh unless otherwise stated.

	Dols.
No. 2X foundry, Phila.	21.76
No. 2 foundry, Valley	18.50
No. 2 foundry, Birm.	15.00
Basic	20.26
Bessemer	20.76
Malleable	20.76
Grey forge	19.76
Ferro-mang. 80% d/d	105.00
O.-h. rails, h'y at mill	43.00
Bess billets	34.00
O.-h. billets	34.00
O.-h. sheet bars	36.00
Wire rods	42.00
	Cents.
Iron bars, Phila.	2.12
Steel bars	1.95
Tank plates	1.95
Beams, etc.	1.90
Skelp, grooved steel	1.90
Skelp, sheared steel	1.90
Steel hoops	2.20
Sheets, black, No. 24	2.85
Sheets, galv., No. 24	3.60
Sheets, blue an'l'd, 9 and 10	2.10
Wire nails	2.65
Plain wire	2.50
Barbed wire, galv.	3.30
Tinplates, 100 lb. box	$5.3

COKE (at ovens).

Welsh foundry	25/- to 27/6
„ furnace	22/- to 25/-
Durham and North.	
„ foundry	16/6 to 17/6
„ furnace	16/6
Midlands, foundry	—
„ furnace	19/- and up

TINPLATES.

f.o.b. Bristol Channel ports.

I.C. Cokes	20×14 box	18/3
„	28×20 „	36/6
„	20×10 „	26/3
„	18¾×14 „	18/9
C.W.	20×14 „	15/3
„	28×20 „	33/6
„	20×10 „	21/3
„	18¾×14 „	16/-
Terneplates	28×20	33/6 per box basis f.o.b.

SWEDISH CHARCOAL IRON & STEEL.

Pig-iron	£6	0	0 to	£7	10	0
Bars, hammered, basis	£17	10	0 to	£18	10	0
Bars and nail-rods, rolled, basis	£15	15	0 to	£16	15	0
Blooms	£10	0	0 to	£12	0	0
Keg steel	£32	0	0 to	£33	0	0
Faggot steel	£20	0	0 to	£24	0	0
Bars and rods, dead soft, steel	£10	0	0 to	£14	0	0

All per English ton, f.o.b. Gothenburg.

TUBES AND FITTINGS.

Up to and incl. 6 in.

	Tubes.	*Fittings.*
Gas	67½%	50%
Water	63½%	45%
Steam	60%	40%

W.I. 10% extra.

DAILY FLUCTUATIONS.

Standard Copper (cash).

		£	s.	d.		
May	30 ..	73	8	9	inc.	21/3
,,	31 ..	73	12	6	,,	3/9
June	3 ..	73	2	6	dec.	10/-
,,	4 ..	73	17	6	inc.	15/-
,,	5 ..	73	18	9	,,	1/3

Electrolytic Copper.

		£	s.	d.		
May	30 ..	83	10	0	dec.	10/-
,,	31 ..	83	10	0	No change	
June	3 ..	84	0	0	inc.	10/-
,,	4 ..	84	5	0	,,	5/-
,,	5 ..	84	5	0	No change	

Standard Tin (cash).

		£	s.	d.		
May	30 ..	196	7	6	dec.	7/6
,,	31 ..	196	5	0	,,	2/6
June	3 ..	197	12	6	inc.	27/6
,,	4 ..	198	15	0	,,	22/6
,,	5 ..	197	10	0	dec.	25/-

Tin (English ingots).

		£	s.	d.		
May	30 ..	197	15	0	dec.	15/-
,,	31 ..	197	15	0	No change	
June	3 ..	199	0	0	inc.	25/-
,,	4 ..	200	0	0	,,	20/-
,,	5 ..	199	0	0	dec.	20/-

Zinc Sheets (English).

		£	s.	d.		
May	30 ..	35	0	0	No change	
,,	31 ..	35	0	0	,,	,,
June	3 ..	35	0	0	,,	,,
,,	4 ..	35	0	0	,,	,,
,,	5 ..	35	0	0	,,	,,

Spelter (ordinary).

		£	s.	d.		
May	30 ..	26	17	6	No change	
,,	31 ..	26	16	3	dec.	1/3
June	3 ..	26	10	0	,,	6/3
,,	4 ..	26	10	0	No change	
,,	5 ..	26	8	9	dec.	1/3

Lead (English).

		£	s.	d.		
May	30 ..	25	0	0	No change	
,,	31 ..	25	0	0	,,	,,
June	3 ..	25	0	0	,,	,,
,,	4 ..	25	0	0	,,	,,
,,	5 ..	25	0	0	,,	,,

AVERAGE MONTHLY PRICES OF STEEL SHIP ANGLES (NORTH OF ENGLAND).

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly average
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1896	4 15 0	4 17 6	5 0 0	5 0 0	5 0 0	4 17 6	4 17 6	4 17 6	4 17 6	5 0 0	5 7 6	5 7 6	4 19 9½
1897	5 7 6	5 7 6	5 7 6	5 5 0	5 0 0	5 0 0	5 2 6	5 2 6	5 2 6	5 2 6	5 0 0	5 5 0	5 3 5½
1898	5 5 0	5 5 0	5 5 0	5 7 6	5 13 9	5 15 0	5 15 0	5 15 0	5 17 6	6 0 0	6 5 0	6 7 6	5 14 3
1899	6 10 0	6 12 6	6 15 0	6 15 0	6 17 6	6 17 6	7 0 0	7 0 0	7 5 0	7 5 0	7 12 6	7 15 0	7 0 5
1900 .. .	7 15 0	8 0 0	8 2 6	8 5 0	8 5 0	8 7 6	8 7 6	8 2 6	8 2 6	8 0 0	7 10 0	7 10 0	8 0 7½
1901	6 15 0	6 12 6	6 5 0	6 0 0	6 0 0	5 10 0	5 15 0	5 17 6	6 0 0	5 17 6	5 17 6	5 15 0	6 0 5
1902	5 12 6	5 10 0	5 10 0	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 7 6	5 11 8
1903	5 6 3	5 6 3	5 7 6	5 12 6	5 12 6	5 10 0	5 10 0	5 10 0	5 10 0	5 10 0	5 10 0	5 0 0	5 8 9
1904	5 0 0	4 17 6	5 2 6	5 5 0	5 5 0	5 5 0	5 5 0	5 5 0	5 0 0	5 0 0	5 0 0	5 5 0	5 2 6
1905	5 5 0	5 7 6	5 10 0	5 10 0	5 10 0	5 10 0	5 10 0	5 10 0	5 12 6	6 2 6	6 12 6	6 12 6	5 14 4½
1906	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	6 12 6	7 2 6	6 13 4
1907	6 17 6	7 2 6	7 2 6	7 2 6	7 2 6	7 2 6	7 2 6	7 2 6	7 2 6	7 2 6	6 12 6	6 12 6	7 0 5
1908	6 2 6	6 2 6	6 2 6	5 17 6	5 17 6	5 17 6	5 17 6	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 16 3
1909	5 12 6	5 12 6	5 12 6	5 12 6	5 12 6	5 7 6	5 7 6	5 7 6	5 7 6	5 7 6	5 7 6	5 7 6	5 9 7
1910	5 16 3	5 17 6	5 17 6	6 1 6	6 2 6	6 2 6	6 2 6	6 2 6	6 2 6	6 7 6	6 7 6	6 7 6	6 2 3½
1911	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 7 6	6 9 0	6 7 8½
1912	6 16 3	6 17 6	6 17 6	7 5 0	7 7 6	7 7 6	7 7 6	7 12 6	7 12 6	7 12 6	7 14 6	7 17 6	7 7 4½
1913	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 11 6	7 7 6	6 15 6	6 7 6	6 2 6	7 8 11½
1914	6 2 6	6 2 6	6 2 6	6 2 6	6 2 6	5 15 0	5 15 0	6 15 0	7 0 0	7 0 0	7 1 3	7 5 0	6 8 7½
1915	7 17 0	8 5 0	8 17 6	9 5 0	9 5 0	9 15 0	9 15 0	9 15 0	9 15 0	9 15 0	10 15 0	10 15 0	9 8 3½
1916	11 3 1½	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6
1917	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6
1918	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6	11 2 6½
1919	11 2 6	13 12 6	13 12 6	13 12 6	17 2 6	17 1 3	17 0 0	17 15 0	17 15 0	17 15 0	17 17 6	18 5 0	16 1 9
1920	19 10 0	20 0 0	21 10 0	22 0 0	23 5 0	24 0 0	24 0 0	24 0 0	24 15 0	24 10 0	24 0 0	24 0 0	22 19 2
1921	22 10 0	20 12 6	19 0 0	17 10 0	17 10 0	16 6 0	14 10 0	14 3 4	13 10 0	11 15 0	10 0 0	9 12 6	15 11 7
1922	9 17 6	10 0 0	10 0 0	10 0 0	10 0 0	9 17 6	9 10 0	8 15 7½	8 14 0	8 12 6	8 12 6	8 12 6	9 7 8½
1923	8 18 1½	9 1 3	9 14 0	10 0 0	10 0 0	10 0 0	9 8 9	9 9 6	9 10 0	9 8 9	9 11 6	9 18 9	9 11 8½
1924	10 0 0	9 18 1½	9 17 6	9 17 6	9 17 2	9 11 3	9 15 0	9 15 0	9 9 4½	9 6 6	9 5 0	9 5 0	9 13 1½
1925	9 2 0	9 0 11½	9 0 0	8 15 9	8 10 3½	8 9 0½	8 6 3	8 2 6	7 19 0½	7 12 3	7 5 0	7 2 6	8 5 5½
1926	7 2 6	7 2 6	7 2 6	7 3 4	7 2 6	7 3 9	7 7 6	7 8 5½	7 9 0	7 12 6	7 16 3	8 0 6	7 7 7½
1927	7 18 9	7 17 6	7 17 6	7 14 8½	7 13 9	7 12 6	7 12 6	7 12 6	7 12 6	7 12 6	7 12 6	7 12 6	7 14 1½
1928	7 12 6	7 14 9	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 17 6	7 16 10½
1929	7 17 6	7 17 6	7 17 6	7 17 6	8 0 6	—	—	—	—	—	—	—	—

WILLIAM JACKS & COMPANY,

WINCHESTER HOUSE, OLD BROAD ST., LONDON, E.C.2.

18, BENNETTS HILL, BIRMINGHAM.

PIG IRON

REGISTERED TRADE MARK

SCOTCH, MIDDLESBRO', HEMATITE, BASIC, SPECIALS, &c.

NON-FERROUS METALS

COPPER, TIN, LEAD, SPELTER, ANTIMONY, CHROME ORE.

WILLIAM JACKS & COMPANY,

19, ST. VINCENT PLACE, GLASGOW.

ZETLAND ROAD, MIDDLESBROUGH.

SMALL ADVERTISEMENTS.

Notice.

Small Advertisements in this section of the Journal are accepted at the prepaid rate of 6d. per line, first line in capitals counting two, average 6 words per line. Minimum charge for one insertion 3/-.

(A remittance should accompany instructions.)

SITUATIONS VACANT AND WANTED.

FOUNDRY FOREMAN desires position; practical and technical training all branches iron and non-ferrous work; experienced on motor, engineering, and jobbing work; up to date on cupola and mixing of metals for all classes of castings; can guarantee results and production.—Box 230, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FOUNDRY TRADES EXHIBITION, 1929.—Experienced London Foundryman disengaged; would like to hear from any exhibitor requiring assistance at the above; would also like to be interviewed with view to obtaining a permanent post in charge of foundrywork.—Box 232, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FOREMAN PATTERNMAKER desires situation; excellent experience on intricate iron, steel and non-ferrous castings for motor, heavy oil engine, and general engineering work; good organiser and experience of piece work; references.—Box 236, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

CHEMIST, METALLURGICAL, wanted for an iron foundry doing all kinds of marine engine castings; state age, experience, and wages expected; when at liberty; give references.—Box 234, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

BRASS MOULDER WANTED.—An old-established firm in the East Midlands have a vacancy for a first-class man accustomed to high-class work; experienced in the making of all sizes G.M. and P.B. centrifugal pump impellers preferred; good wages and permanency to suitable man.—Apply in confidence, stating age, wages required, and fullest possible details of past experience, to Box 238, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

WANTED.—First-class Architectural Bronze Moulder for old-established Canadian manufacturer; new foundry in process of completion; excellent modern working conditions; steady work, first-class wages; passage paid.—Apply, with history and references, to the Old Colony Club, 84, Leadenhall Street, London, E.C.3. Managing Director will be in London June 10.

PROPERTY.

11 ACRES WORKS SITE.
SHEFFIELD.
145,000 Sq. Ft. of SHOPPING,
Compact and Convenient.
SIDING CONNECTIONS
with L.M. & S. and L. & N.E. Rlys.
WELL-BUILT & COMMODIOUS OFFICES
Will Sell whole or in lots to suit customers or Let on favourable terms. Unique opportunity for Manufacturers.
Apply—
THOS. W. WARD, LTD.,
ALBION WORKS, SHEFFIELD.

A TRAFFORD PARK BARGAIN.—Modern Foundry with own railway sidings, excellent warehouse, packing room and fine offices, centrally heated, for SALE. Premises are all one storey and easily adaptable for other trades. Cost £20,000 in 1921. For a quick sale, owners will take £2,000, including two 4-ft. modern cupolas and Keith-Blackman motor and fan.—F. S. AIREY, ENTWISTLE & COMPANY, 10, Norfolk Street, Manchester.

MACHINERY.

SAND MIXERS.—New and second-hand. Ask us to quote.—W. BREALEY & COMPANY, LIMITED, Prospect Works, Hawksley Avenue, Sheffield.

FOR SALE.—8-in. Mumford Type Plain Jolt Ram Moulding Machine by Jackman; table 30 x 42; any reasonable offer accepted.—Can be seen by appointment at RODNEY FOUNDRY, Deptford Green, S.E.8.

7-in. swing CHURCHILL Internal Grinding Machine.

10-in. x 20-in. LANDIS Plain Centre Grinding Machine, with travelling head.

No. 7A SUNDERLAND Gear Generating Machine, capacity 18 in. dia. x 9 in. wide.

No. 60 HEALD Internal Grinding Machine, with planetary head.

Two HORIZONTAL SINGLE AND DOUBLE PURCHASE STEAM WINCHES (Wilson), cyls. 7-in. x 10-in. stroke; drum 12½ in. x 38 in.; brake.

Fourteen HORIZONTAL SINGLE PURCHASE STEAM WINCHES (Lidgerwood), cyls. 8¼-in. x 8-in. stroke; drum 16½ in. x 19 in.; brake.

Several high-class nearly new SCOTCH MARINE BOILERS, 10 ft. 9 in. long x 13 ft. 3 in. dia.; for 125 lbs. working pressure; in first-class condition and complete with fittings, ready for immediate delivery.

Two wrought-iron or steel fresh-water TANKS, each about 8 ft. x 7 ft. x 6 ft. deep x about ⅜ in. thick, capacity about 2,098 galls. each.

(ASK FOR "ALBION" MACHINERY CATALOGUE.)

THOS. W. WARD, LTD.,
ALBION WORKS, SHEFFIELD.

MISCELLANEOUS.

GANISTER, best quality, for cupolas, also for Steel Works.—ASTBURY SILICA COMPANY, "The Brooms," Park Lane, Congleton.

PATTERNS.—Inquiries solicited; quotations by return; shop equipped with modern machinery; quick delivery.—CLEGHORN & COMPANY, Midland Pattern Works, Spring Gardens, Worcester. 'Phone 264.

STOP! LOOK! LISTEN!
FOUNDRYMEN, ENGINEERS, STEEL WORKERS.
Write, Wire, Telephone, Call, for our Fourth Edition Handbook.
Foundrymen and Engineers—The Success of 1929. Foundry Managers, Foremen, Superintendents, Production Managers, Core Makers, Metallurgists, Chemists, Engineers, Iron and Steel Workers, Patternmakers, Melters, Cupola Attendants, Furnace Managers (all classes of steel-making), should be in possession of this Handbook (no charge).
NOTE SPECIALLY.—Our Stand at the International Foundry Exhibition in June is No. 4, Row E, and we extend a hearty invitation to all those interested to call at our Stand for a copy of this Handbook, and discuss their problems with our technical staff, who will be in attendance.
Write, Wire, Telephone, Call.
Head Office and Works:
BEECROFT & PARTNERS, LIMITED,
Foundry Chemists,
Core Compounds, Plumbagoes, Foundry Fluxes, Parting Powders, etc., etc.,
RETORT WORKS, MAPPIN STREET, SHEFFIELD.
LABORATORIES, including Analytical, Physical Testing and Microscopical, St. Peter's Close, SHEFFIELD.
Stand 4, Row E, at the International Foundry Trades Exhibition, London, June 5 to 15, 1929. Overseas Delegates are also invited to visit our works in Sheffield during their visit.

CHARCOAL.—Powdered, granulated, lump, blacking; inquiries invited.—J. BUCHANAN & COMPANY, Ashfield Road, Altrincham, Cheshire.

MISCELLANEOUS—*Continued.*

FOUNDRY. — Opportunity occurs for acquiring whole or controlling interest in private Company owning large, modern, and exceptionally well-equipped Ferrous and Non-Ferrous Foundry near London. Large turnover and satisfactory profits. Now employing over 100. Every opportunity for closest investigation will be given to *bona-fide* purchasers. Principals only.—Apply, in first place, to MESSRS. ALLEN, EDWARDS & OLDFIELD, Solicitors, 3, Salters Hall Court, Cannon Street, E.C.4.

BRASSFOUNDRY RESIDUES. — Ashes, Skimmings, Grindings, Dust, bought for best prices; collected by lorry radius 30 miles London, or ex rail beyond.—Communications, KINRIX, 199-201, Warwick Road, London, W.14. 'Phone: Western 0273.

FOR SALE.—Du-Ram Patent Steel Moulding Boxes, as used by all the leading foundries. Perfect interchangeability and accuracy together with long life. Inquiries solicited. Quick deliveries.—J. W. SADLER & COMPANY, LIMITED, Bartle Lane, Great Horton, Bradford.

FLUORSPAR.—The ideal Flux for all Foundry and Furnace work; supplied in crude lump, washed gravel or finely ground. Samples and prices from
A. BECK,
MINEOWNER, MATLOCK.

PATTERNS OF ALL DESCRIPTIONS. LARGEST WORKS IN THE MIDLANDS. QUOTATIONS BY RETURN.
G. PERRY & SONS,
HIGHCROSS STREET, LEICESTER.

RYLAND'S DIRECTORY of the Coal, Iron, Steel, Tinplate, Metal, Engineering, Hardware and Allied Trades. 1928 edition. Price 42s. net, bound in cloth. Published by INDUSTRIAL NEWSPAPERS, LTD., 49, Wellington Street, Strand, London, W.C.2.

FOUNDRY REQUISITES
Try our REFRACTORIES.
Ganister or Silica Bricks and Blocks (any shape or size)
Sands, Cements, Ganister.—*Let us have your enquiries*
THE
CLEVELAND MAGNESITE & REFRACTORY CO., LTD.
Normanby Brickworks, Normanby, Eston, Yorks

'Phone: 287 SLOUGH

CRANE LADLES

15 Ton STEVENSON (as New)	£65
10 Ton EVANS (as New)	£48
8 Ton EVANS (as New)	£42
5 Ton EVANS (as New)	£35
4 Ton EVANS (as New)	£30
2 Ton JACKMAN (as New)	£24
1 Ton New (enclosed gear)	£19

ANY LADLE SENT ON APPROVAL
LARGEST STOCK OF FOUNDRY PLANT IN ENGLAND. PLEASE SEND FOR LISTS
BUY FROM ME AND SAVE MONEY
ALEX. HAMMOND, *Foundry Machinery Merchant,*
14, AUSTRALIA ROAD, SLOUGH